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MINUTES OF THE PROCEEDINGS

METEOROLOGICAL OFFICE
30 JAN 1963
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OF THE

METEOROLOGICAL COMMITTEE,

1867.

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METEOROLOGICAL COMMITTEE.

Burlington House, January 3, 1867.

PRESENT:

General Sabine in the Chair.

Mr. De la Rue.	Mr. Spottiswoode.
The Hydrographer.	Mr. Gassiot.
Colonel Smythe.	Dr. Miller.

Read—Letter from Mr. Farrer to the President of the Royal Society as follows :—

" SIR, Board of Trade, Whitehall, December 5, 1866.

" I AM directed by the Board of Trade to enclose copies of letters addressed by this Board to the Boards of Treasury and Admiralty on the subject of the proposed changes in the conduct of the business of the Meteorological Department of this Board.

" I also enclose copies of the replies received from those Boards, and I am to request that you will have the goodness to bring these papers to the notice of the Council of the Royal Society.

" It will be seen from the correspondence that the Board of Trade, the Admiralty, and the Treasury have agreed to the original proposals submitted by the Board of Trade to the President and Council, subject to the modifications of these proposals contained in your letter of the 27th October last, and that the Treasury have authorized the preparation of estimates upon the basis of those proposals.

" I also enclose a copy of a circular concerning the storm-warnings which, in consequence of the modifications of the original proposals of the Committee by the President and Council, the Board of Trade have found it necessary to issue.

" As it is desirable, with a view to the coming Session, that the Estimates should be prepared without delay, and as it is also important that no time should be lost in establishing the new system of observations, I am to suggest, for the consideration of the President and Council, that they should appoint the proposed Committee with as little delay as possible, and that the Committee should, when appointed, at once place themselves in communication with the Board of Trade.

" I have the honour to be, &c.

" The President, Royal Society. T. H. FARRER."

Read—Minute of the Council of the Royal Society of the 13th December 1866 nominating the present Committee, as follows :—

Resolved—That a Standing Committee be appointed for the purpose of superintending the Meteorological Observations to be made for the Board of Trade in accordance with the foregoing letter.

That the following gentlemen be nominated as members of this Committee:—

1. Lieut.-General Sabine
2. Mr. Gassiot
3. Dr. W. A. Miller
4. Mr. De la Rue

} Members of the Kew Committee.

5. Mr. Francis Galton
6. Mr. W. Spottiswoode

} Officers of the British Association.

7. The Hydrographer to the Admiralty.
8. Col. Smythe, R.A.

That this Committee place themselves in communication with the Board of Trade.

That in the event of a vacancy occurring in the Committee, the fact be communicated to the Council of the Royal Society, in order that they may appoint a new member.

Read—The following letter from the Board of Trade :—

" SIR, Board of Trade, Whitehall, December 22, 1866.

" I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 15th instant conveying a copy of a resolution, from which it appears that the President and Council of the Royal Society have resolved to appoint a Standing Committee for the purpose of superintending the Meteorological Observations undertaken by the Royal Society, and that this Committee should place themselves in communication with the Board of Trade. In reply, I am to state that the Board of Trade are ready to consider the arrangements to be proposed by the Committee as soon as they are communicated.

" I have the honour to be, &c.

" The Secretary, Royal Society. T. H. FARRER."

The Chairman presented a memorandum of a conference held in Ashley Place, and of a subsequent interview with Mr. Farrer.

Resolved—That Mr. Balfour Stewart be appointed Secretary to this Committee and Director of the Normal Observatory at Kew for the current year at a payment of £400 salary, to commence from the 1st of January, the Secretary not undertaking any other work except that of the Kew Observatory.

Resolved—That Mr. Robert H. Scott be appointed Director of the Meteorological Department of the Board of Trade for the current year, on a payment of £800, the salary to commence from the 1st of January, the duties of the Director to be defined by the Committee. He will attend the meetings of the Committee as often as may be requested.

Read—Letter from Mr. Buchan, Secretary of the Scottish Meteorological Society, to General Sabine, regarding telegrams, which General Sabine agreed to reply to, suggesting that Mr. Buchan make a definite proposal.

General Sabine likewise alluded to the contents of a letter from Mr. Matteucci to him, regarding telegrams, which he agreed to reply to, stating that the Committee approve generally of the plan, and requesting details.

A statement regarding the forwardness of the various outlying Observatories was given by General Sabine, and the Secretary made a similar statement with regard to Kew. The subject of Ocean Statistics was discussed, and was referred to the Hydrographer for his assistance and advice.

Mr. Scott presented the following memorandum with regard to a pension :—

"To the Committee of the Royal Society, Meteorological Department.

"Mr. Chairman and Gentlemen, January 3, 1867.

"While I feel most deeply the honour which your Committee have been pleased to confer on me, in nominating me for the post of Director of the Meteorological Department of the Board of Trade, I beg most humbly to bring under your notice the following considerations :—

"My letter to the President of the Royal Society, dated Oct. 29, 1866, in which the amount of salary was named at eight hundred pounds, was written on the understanding, conveyed to me orally by the President, that in framing my estimate I should take into consideration that the acceptance of such an office would not invalidate my claim to a pension as a Civil Servant.

"I therefore request the Committee to take this into their consideration, noting the fact that the salaries of all officers on the Civil List are included in the annual Estimates, and yet that these officers are entitled to pensions according to the regular scale.

"My own appointment in the Royal Dublin Society is one of a nature similar to that which is now proposed for me, and in virtue of holding it, which is an annual office, I am entitled to a pension.

"I should accordingly request that the Committee would ascertain this point before the appointment is definitely made.

"I have the honour to be, &c.

"Robert H. Scott."

Resolved—That General Sabine and the Hydrographer communicate regarding it with the Board of Trade.

The Committee then adjourned until Tuesday, the 8th inst., at 3 P.M.

METEOROLOGICAL COMMITTEE.

Burlington House, January 8, 1867.

PRESENT :

General Sabine in the Chair.

Mr. Spottiswoode.	Col. Smythe.
Dr. Miller.	The Hydrographer.
Mr. De la Rue.	

The Minutes of last meeting were read and confirmed.

General Sabine reported having replied to the letters of Mr. Buchan and Mr. Matteucci in the terms agreed to at last meeting.

The Hydrographer reported a conversation he had with Mr. Farrer, on the subject of Mr. Scott's letter to the Committee of Jan. 3 (see Minutes of Committee for Jan. 3), the substance of which is embodied in the following letter:—

" My dear Capt. Richards, January 4, 1867.

" With reference to our conversation to-day, I have been thinking the subject over, and I feel more and more satisfied that we could not recommend and that the Treasury could not agree to any proposal for placing the officers appointed by the Meteorological Committee on the footing of permanent Civil Servants. The vote is an experimental one. If the work done is what we hope and expect, there is no fear of its non-continuance. But the very object of the whole scheme is to place the matter from year to year in the hands of the Scientific Committee, unfettered by vested interests or by that fixity of tenure in their servants which is so fatal when the Government undertake a matter of this kind. Their object will be frustrated if their officers become Civil Servants. They (the Committee) will no longer have the power of dismissing them; that power must rest with the Treasury; and the Treasury, having to pay compensation, will never exercise it, even if the Committee brought themselves to advise them to do so. You will be the servants, and your officers will practically be your masters; nor could it be heard of at the Treasury that the Government should place the patronage in the hands of the Committee, and then treat the nominees of the Committee as Civil Servants. Really and truly a good servant, who has faith in himself and in his work, is much better off under the free system than under the fixity of tenure system. I am quite sure neither the Board of Trade nor Treasury would listen to the suggestion.

" Believe me very truly yours,

" Capt. Richards, R.N. T. H. Farrer."

The substance of this letter having been communicated to Mr. Scott, the following reply was received from him:—

" Dear Sir, 13, Ashley Place, January 8, 1867.

" I have to acknowledge the receipt of a letter from you and Capt. Richards, dated January 5, enclosing one from Mr. Farrer of the previous day. As I learn from these letters that it is not in the power of the Meteorological Committee of the Royal Society to confer on their officers the standing of Civil Servants, I have to request that you will inform the Committee that I am prepared to accept the directorship of the Meteorological Department, on the terms set forth in their resolution of the 3rd inst.

" I shall at the same time most respectfully request that the Committee will place on their Minutes some notice to the effect that the hesitation on my part in accepting the terms of the resolution arose not from any afterthought whatever, but from a real misconception of the precise conditions which had been originally offered to me.

" I remain, Sir, yours truly,

" Lieut.-Gen. Sabine, P.R.S. Robert H. Scott."

In connexion with this matter the following letter from Mr. Scott to General Sabine was read:—

" Dear Sir, Royal Dublin Society, October 29, 1866.

" I have considered most carefully the proposal which I had the honour of receiving from you last Wednesday, and I have decided that I shall be prepared to undertake the duties of the directorship of such a meteorological office as that which you described to me, in case the Council of the Royal Society think fit to propose my name to H. M.'s Government for that office.

" Inasmuch as the duties of the post will take up my entire time, and will entail very serious responsibility on me, I feel that I cannot, in consideration of my position and prospects here, undertake the situation at a less salary than £800 per annum.

" I should hope that I should be allowed a vacation of at least six weeks in each year.

" Travelling expenses for all business connected with the office would be of course allowed.

" I need scarcely say that should the Government do me the honour of selecting me, no endeavours of mine shall be wanting to render the office a satisfactory one.

" I have the honour to be, &c.

" Lt.-Gen. Sabine, ROBERT H. SCOTT.

" Pres. Royal Society, &c. &c. &c."

Mr. De la Rue proposed that General Sabine be Chairman, and Dr. Miller Deputy Chairman. The motion was seconded by Captain Richards, and carried unanimously. General Sabine reported that he had written unofficially to Mr. Hartnup, Director of the Liverpool Observatory, mentioning Mr. Buchan's suggestion with regard to Leith, recognizing the importance of the suggestion, and asking Mr. Hartnup what view of this matter would probably be taken at Liverpool.

General Sabine read also a private letter from Captain Toynbee to him, and his reply to it.

Resolved, on the motion of the Hydrographer,—That a letter be written to Captain Toynbee offering to appoint him as Marine Superintendent to the Meteorological Department for the current year at the salary of £350, and that the Chairman be requested to be the channel of communication with Captain Toynbee.

The following sketch by Captain Richards of the probable duties of the Marine Superintendent was read and generally approved of by the Committee, and it was agreed that the communication with Captain Toynbee should be upon this basis :—

" The report of the Committee on the Meteorological question must, I think, be taken as the basis of the duties to be performed by the Nautical Department of the establishment, and the head of that branch should make himself thoroughly acquainted with the proposals and recommendations contained in that report.

" He should make himself conversant with the mode in which the duties have been hitherto carried on ; should obtain correct lists of all instruments, registers, and other property belonging to the Department; the numbers that are at present embarked in merchant ships, those at the royal dockyards in store for the navy, and those actually in possession of the Department in London.

" He should ascertain what system of purchase has been adopted, what makers employed.

" He should carefully consider whether any modification of the present system is desirable, either in the character of the instruments or the manner of procuring them, and especially of the registers, which it is believed are capable of much simplification in the nature of the data to be collected, and in regard to the size of the books themselves, now inconveniently unwieldy.

" On these subjects he should be prepared to place his views and proposals before the Committee on paper as soon as possible.

" As soon as the Department is organized he should take the first steps towards resuming the collection of statistics. It will be desirable to commence with great caution, to avoid by all means an indiscriminate issue of instruments and registers at first, not only in regard to the financial state of the Department, but to avoid overcrowding it with observations already needlessly repeated.

" In this respect he should be guided by the documents which he will find in the office, and in communication with the Hydrographic Department of the Admiralty, which has undertaken to turn to account the observations obtained.

" It would probably be necessary, as a preliminary to issuing instruments, to open a correspondence with the commanders of certain ships which traverse the seas least frequented, and of which we have the least knowledge, and perhaps with some of the great Steam Company directors.

" This correspondence should be carried on by the Marine Superintendent ; it should not extend beyond what is really necessary. Copies should be entered in a book, which should be produced periodically to the Committee.

" A report should also be made to the Committee, say quarterly, containing all the transactions of the preceding quarter ; instruments, &c. issued ; results received ; office work performed ; data supplied to the Admiralty, &c.

" As to the form of discussing and tabulating the observations received, the report of the late Meteorological Committee of the Board of Trade goes fully into this part of the subject, and their recommendations should in as far as possible be adopted.

" As soon as the Department is in working order, the registers, as soon as received, should be examined, and any matter of interest to navigation communicated to the Hydrographic Department of the Admiralty. This should be an understood regulation ;

but in regard to the Ocean Statistics, the Hydrographic Department would ask from time to time for the data they require, and this is all the connexion which need exist between the Admiralty and the Meteorological Department.

" The question of bringing up the arrears of discussion and tabulation is a large one, and should not be lost sight of; on the contrary, it should methodically and systematically be commenced, and a certain portion of time given to it daily, but it must be subordinate to the arrangement of dealing with the new material.

" The relations between the Marine Superintendent and the Director I need not touch on. They will no doubt be close ; and one of the most important objects to be kept in view is to arrive at some sound and reliable laws by which the science may be turned to *practical* account, not only to seamen but to men engaged in all other pursuits.

" On this, in my opinion, will entirely depend the success of the Institution, which it may be said is only now being initiated, and if it is successful in this respect, there is no fear but it will be a permanent and an increasing one."

Mr. De la Rue wished to place on record that Mr. Benjamin Loewy, of the Kew Observatory, had applied for some employment in reducing marine observations.

The Committee then adjourned until Tuesday, the 15th inst., at 3 o'clock.

METEOROLOGICAL COMMITTEE.

Burlington House, January 15, 1867.

PRESENT:

General Sabine in the Chair.

Dr. Miller.	The Hydrographer.
Mr. De la Rue.	Colonel Smythe.
Mr. Gassiot.	Mr. Spottiswoode.

General Sabine reported that he had received a letter from Captain Toynbee, accepting the proposal made to him.

The Hydrographer communicated the following letter which he had received from Captain Toynbee:

"DEAR SIR, January 11, 1867.

"THE Committee of the Royal Society appointed to re-model the Meteorological Department of the Board of Trade, of which you are a member, have done me the honour of offering me the appointment of Marine Superintendent to that Department. Yesterday I called on General Sabine and accepted it, at the same time calling his attention to the fact that the Board of Trade have several commanders of ships serving them in different capacities, such as examiners in navigation or seamanship, heads of shipping offices, &c. &c. To these gentlemen they give 300*l.* the first year, increasing that sum by 15*l.* each year until it amounts to 400*l.*; they also give a retiring pension in some cases. I also said that the appointment which I have accepted seems to need higher acquirements than those of simple navigation and seamanship, so that I hoped your Committee would not think it wrong of me to name this, and to ask if they felt it in their power to recommend that the additional 15*l.* be added to my salary until it amounted to 450*l.*, which would place me in a fair position with my brother officers, whose appointments have not the same difficulties, and who are in some cases liable to receive a retiring pension, which I suppose your Committee cannot give.

"General Sabine seemed to think that the Committee had the power to recommend an increase of salary in future years, but wished me to mention it to you as a sailor, and having the more especial management of the Marine Department.

"I remain yours faithfully,

"Capt. Richards, R.N., Hydrographer to the Admiralty. HENRY TOYNBEE."

It was agreed that the Secretary should reply to Captain Toynbee, stating that the Committee are only authorized to provide Estimates for the Meteorological Department from year to year, and that to establish an annually increasing salary to the officers would be implying a permanency to the Department which they have no power to do.

Resolved—That in organizing telegraphic communication to various stations at home or abroad the messages shall all pass through the Central Office, and those received from the Central Office by the ports shall be published promptly by them.

General Sabine read a letter from Mr. Buchan to him.

Resolved—That General Sabine be requested to reply to Mr. Buchan to the following effect:

> "The Committee foresee no difficulty in supplying the state of the weather from the five ports mentioned, if that be an object to the Leith Chamber of Commerce, and inquiry might be made as to the cost of this. It will be a condition that any information communicated shall be forthwith published."

Resolved—That General Sabine be requested to communicate with Professor Dove to the following effect:

> "The Committee could supply him with telegrams from Valentia, and might want in return a daily communication of the telegrams he receives at Berlin from Riga and Groningen. What would be the cost of these, and in how long a time after the telegrams are despatched from their respective ports might they reach London?"

General Sabine alluded to the contents of a letter he had received from Mr. Matteucci, regarding telegrams.

Resolved—That General Sabine be requested to write to Mr. Matteucci, stating that the Committee assent to his proposition.

Professor Wheatstone, at the invitation of the Chairman, exhibited to the Committee an instrument of his invention for telegraphing the state of the meteorological elements at great distances and at ordinarily inaccessible points; also applicable to deep-sea temperatures.

After some discussion of Estimates, the Committee adjourned until Monday, the 21st inst., at 3 o'clock.

METEOROLOGICAL COMMITTEE.

Burlington House, January 21, 1867.

PRESENT:

General Sabine in the Chair.

Mr. Gassiot.	Colonel Smythe.
Mr. De la Rue.	Mr. Spottiswoode.
The Hydrographer.	Dr. Miller.

The Minutes of last Meeting were read and confirmed.

A rough Draft of Estimates made out at last Meeting was again brought up, and the following was finally adopted by the Committee.

YEARLY EXPENSES.

Salaries of Officers—		
Secretary to Committee	£400	
Director	800	
Marine Superintendent	350	
		£1,550
Salaries of Clerks		1,000
Annual Expenses of Eight Observatories, including the Central		2,000
Purchase and Repairs of Instruments issued to the Mercantile Marine		300
Do. Admiralty Instruments		400
Verification of Instruments		50
Weather Books		150
Travelling Expenses		300
Carriage of Instruments to and from the Ports		150
Agencies at the Ports for supplying Instruments to the Ships		200
Telegraphs		3,000
Office and Contingencies		800
		£9,900

OUTFIT.

To complete the Instruments of the Eight Observatories	£1,700
Buildings and Alterations at Kew	1,200
	£2,900

Captain Richards agreed to put this Draft in a form proper for communication, and suggested, that when printed, it should be accompanied with the two following letters which he had drawn up, and which were approved of by the Committee.

I.—CHAIRMAN OF COMMITTEE TO SECRETARY OF BOARD OF TRADE.

SIR, Royal Society, January 21, 1867.

I HAVE the honour to forward an estimate prepared by the Committee for the expenses of the Meteorological Department during the years 1867-8.

As the present estimate must, until the Committee have had more experience in the working and requirements of the department, be considered in some measure an experimental one, it is probable that while some of the items provided for may exceed the sums assigned, others will fall short of them; but the Committee will be prepared at the close of the financial year to render to the Board of Trade an account under the several heads of expenditure, and strictly to confine themselves within the sum total which the Treasury may grant.

The Committee desire to express their sense of the responsibility they incur in the judicious management of these funds, and in the management of them will keep in view the necessity of the strictest economy on their part, which may be consistent with the efficient working of the department for the advancement of science, and for the practical benefit of the public interests.

I am, &c.,
(Signed) EDWARD SABINE,
Chairman of the Meteorological Committee.

To the Secretary of the Board of Trade.

II.—CHAIRMAN OF COMMITTEE TO SECRETARY OF THE BOARD OF TRADE, MARINE DEPARTMENT.

SIR, Royal Society, January 21, 1867.

I HAVE the honour to inform you that the Committee appointed to superintend the Meteorological Department have selected the following gentlemen to carry out under them the various duties of the Department, namely :—

Robert H. Scott, Esq., of Trinity College, Dublin, as Director, with a salary of 800*l.* per annum; Captain Henry Toynbee, of the Mercantile Marine, as ~~Nautical~~ Marine Superintendent, with a salary of 350*l.* per annum; Balfour Stewart, Esq., of Kew Observatory, as Secretary to the Committee and Director of the Central Observatory, at a salary of 400*l.* per annum.

And if the President of the Board of Trade is pleased to approve, the Committee would suggest that Mr. Simmonds, the gentleman now in charge of the Meteorological Department, be so informed and desired to give over the charge to such of those gentlemen as the Committee may appoint to receive it.

The Committee would also suggest that Mr. Simmonds be informed that the further appointment of clerks on the establishment is vested in them, and that any communications which the present officers may have to make on this or any other subject connected with the Meteorological Department be addressed to the Secretary of the Committee at Kew Observatory, Richmond, S.W.

I am, &c.,
(Signed) EDWARD SABINE,
Chairman of the Meteorological Committee.

To the Secretary of the Board of Trade.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

The Committee met at the Meteorological Office, 2, Parliament Street, on Thursday, February 14th, at 11 a.m.

PRESENT :

General Sabine in the Chair.

Captain Richards.	Mr. Spottiswoode.
Colonel Smythe.	Mr. Gassiot.
Mr. De La Rue.	

Mr. R. H. Scott, Director, attended.

Read—Letter from Mr. Farrar to Chairman with reference to Colonel Sykes' Notice of Motion in the House of Commons relative to storm-warning signals.

Resolved—That the Chairman do send the following reply:

Minute.

The usefulness of the present stations from which telegraphic communications are daily received is under consideration, but the final selection of the stations is in the hands of the Committee, who are of opinion that no advantage would be gained by receiving communications from *Paris*, *Brussels*, and *St. Petersburg*. These stations are not on the sea coast, and telegrams from that last mentioned would not be received in time for publication in the daily papers. This is also the case with Skuddesnæs, the Helder, and Corunna. The Committee already receive six telegrams from the coasts of the Continent, and none have been discontinued since the Department has been in their hands.

They are not prepared at present to recommend any additional expense to be incurred on this head.

EDWARD SABINE, Chairman.

Received and read—Captain Toynbee's Report on the condition and requirements of his Department.

Ordered—That the Report be printed for the consideration of the Members of the Committee, 25 copies.

Received—Letters from the clerks in the Office asking if they would be continued.

Consideration postponed.

The following were arranged as the hours of the Office. 10 to 4 o'clock daily, except Saturday, when half the clerks in rotation are excused attendance after 2 o'clock, p.m.

The following to be kept as close Holidays:

Christmas Day. Good Friday.
Easter Monday. Whit Monday.
The Queen's Birthday.

Read—Applications relative to Fishery Barometers from Ringsend, Morecambe, and Harwich.

See Minutes on Letters. One granted to Harwich; permission granted to Morecambe to retain that which they now have, provided no further expense be incurred by this Committee; application from Ringsend not complied with.

The Director submitted an Inventory of the furniture and fitments found by him in the Office, and also a Memorandum of certain points on which instructions should be obtained from the Board of Trade.

To be forwarded by the Secretary of this Committee to the Board of Trade.

Read—Letter from M. Le Verrier of 9th December 1865, relative to his proposed synoptic chart.

Mr. Scott to reply that the Committee wish for a precise account of M. Le Verrier's present wishes on the subject. They will be glad to assist in so far as the special duties of the Office will permit.

The Committee then adjourned till Monday the 18th instant, at 3 p.m.

12.1.

Having accepted the appointment of Marine Superintendent to the Meteorological Department, I think it right to communicate to you my views as to the future working of that Department, which I have formed after reading the Report of the Committee of Inquiry and visiting the present Office for some days.

I place these views before you merely as suggestions in order to devise a good working system.

Weather Books.

1st. As to the Weather Books now on hand from which the data have to be extracted.

From a cursory conversation with Mr. Simmonds I am led to suppose that some of them are in part defective; for instance, in several cases the thermometers have been kept in a warm cabin instead of the open air. The wet-bulb thermometer has not been understood. Barometers in steamers have been very much heated by being near boilers, and the observers have given over observing the attached thermometers, *because they were so high.* The winds have in many instances been very loosely registered, as S.E.ly, Northerly, &c., &c.

Hence I am led to suppose that personal communication with commanders, and a well-devised circular letter, explaining what is required of them, would add much to the value of the observations, and that the Weather Books now on hand will require examining with an eye to their value.

Card.

As to the form of card proposed by the first Committee for extracting data from the logs. If we decide upon adopting it, I shall be glad to know if we are to begin on the logs (even those that have already been dealt with) and extract all their matter in this systematic form.

If so, it will be necessary to know whether we are to extract every observation that has been made. Should this be the case it will be requisite to get the latitude and longitude of the observations which intervene between noon and noon by interpolation, as few ships enter their position more than once a day.

It would be well to find out the number of Weather Books we have for any particular voyage, also that a chart divided into squares shall have the track of this voyage laid down upon it; that the data for one of these voyages be extracted from its Weather Books, to prove how many observations in each square one voyage yields. This would help us to know how many more of such voyages were needed to complete the required number of observations in its squares.

With an idea of discovering the staff required to deal with the Weather Books on hand, I shall name what strikes me as work to be done.

1st, To look through the logs with the object of discovering internal evidence of their worth.

This perhaps I might do, noting at the same time anything in the shape of remarks which should be extracted for the use of the Hydrographic Office or other Department. The Report of the first Committee alludes to some method of calculating the "probable precision" and "weighting the logs." For this I should wish for more precise directions.

2ndly, Interpolation of latitude and longitude for each intermediate observation between noon and noon.

3rdly, To correct the readings of the different instruments and reduce them to an uniform standard, and to calculate the tension of vapour, to correct the direction of the wind for variation, &c. &c.

4thly, To extract the data and enter them on the cards; this to be done first for one voyage in each track, with the object of discovering how many more voyages we need on each track to complete the number of observations in each square.

5thly, To lay down the tracks of voyages, on a squared chart, for which we have data, the use of which is explained in No. 4 above. A squared track chart of each voyage to be placed in the Weather Book before issuing it, with blank space for notes respecting our wants of special work to be done in any square or squares.

6thly, To lay down tracks of voyages which pass through squares for which we have no data.

7thly, To communicate with shipowners, directors of companies, and more especially with commanders as to getting reliable observations. This work I might undertake. Here I may remark that much of our success depends upon our getting *able observers*,

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who will enter *con amore* into the work. Each one should, if possible, be seen; he should be invited to visit my office, where a complete set of instruments should be kept in working order, and I would myself explain their use.

Circular Letter.

A circular letter (see accompanying circular letter) could be drawn up for sending to Commanders with the object of explaining to them what we wished them to undertake, before letting them have the instruments.

Those who are appointed to issue the instruments in other ports should be required first to send the circular letter to Commanders, and discover if they be willing to work; they should also see each Commander before letting him have the instruments, and explain the handling of them to him.

Improvements in Weather Books.

I will now proceed to say a few words on changes to be made in the Weather Books.

They are rather unwieldy and would be better with four instead of five days in a page. The minimum number of daily observations for which the instruments will be granted should be clearly stated, and the hours at which they must be taken should be clearly marked, either by a different colour, or a thicker line across the whole book, as well as larger figures.

With most observers, the fewer the observations required, the more likely they are to be trustworthy. It should be made quite clear that good quality is preferred to large numbers of observations. Commanders should be requested to record which observations, if any, are made by others besides themselves. My custom was to enter those taken at 4 a.m. (by my 2nd officer) in red ink. At 6 a.m., 8 a.m. noon, 4 p.m. and 8 p.m., I took them myself.

Rough Books.

It would be well to issue "Rough Books," mainly for being carried about from instrument to instrument, in which the Commander could make the entries in pencil to be afterwards copied into the Weather Book. These books might be kept by the Commanders for reference on future voyages. I supplied myself with them, and found them most useful. Mine can be seen for samples. In case of a supposed clerical mistake in copying, the rough books may be asked for as a reference. If they had indelible pencils they need not be inked over as mine were.

I have already said that a squared chart with the track of the intended voyage upon it should be placed in each Weather Book, with a blank space for calling attention to anything special.

Commanders should be requested to have the latitude and longitude by dead reckoning calculated for the time of each observation between noon and noon. This might be systematically done by a junior officer, and with the ship's log to refer to, it would be much more correct than our interpolations.

Clouds.

More space is needed for entering the upper stratum of clouds and the direction in which they move.

The form or character of clouds needs more space, the *amount* would do with less.

Here I would remark on the importance of paying more attention to the upper stratum of clouds. The clouds of this stratum (or, as there are sometimes two, I ought to say of these strata) are better defined than those of the lower stratum, they consist chiefly of cirrus, cirro-cumulus, and cirro-stratus; whereas the lower clouds are often so mixed that it is impossible to name them, and it would be well to ask Commanders in such cases merely to give the amount, just entering the names of any which are well defined, and remarking on their position, motion, &c., as regards the wind. For instance, it is said (and my experience agrees with the saying) that cumuli forming to leeward are a good sign that a gale is coming to an end.

Commanders should be cautioned that clouds moving over clouds are very liable to deceive the observer as to the direction in which they are going. In the day time their motion over the sun and moon should be watched, and slips of coloured glass of varied darkness might be supplied for watching clouds passing the sun. At night the stars supply abundant means for watching the motion of clouds in the different strata of air.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 18 *February*, 1867.

PRESENT :

General Sabine in the Chair.

Mr. Gassiot.	The Hydrographer.
Mr. De La Rue.	Dr. W. A. Miller.
Colonel Smythe.	

The minutes of the two previous meetings were read and confirmed.

The Director and Secretary to the Committee were in attendance.

The Secretary communicated the following letter which had been addressed to him by the Director:—

DEAR SIR, Meteorological Office, Feb. 18, 1867.

I HAVE to request that you will have the kindness to ask for instructions from the Board of Trade for this Department on the following points.

I. It would be a great convenience if all letters for the Meteorological Department were registered in this office exclusively.

II. Permission should be obtained, if possible, to frank all official letters as heretofore.

III. That the stationery, &c. required by the office be supplied by H. M.'s Stationery Office.

IV. That enclosed inventory of furniture and fitments of the office be countersigned by the Board of Trade, and that the Committee be authorized to retain them.

V. That it should be settled how the accounts for the future are to be kept, and by whom the bills are to be paid. Arrangements should be made for the payment of petty expenses at the office.

VI. As the Committee have in contemplation to commence works at Kew without delay, they will be obliged to apply for some portion of their grant in advance.

Yours faithfully,

B. Stewart, Esq., Secretary to the Committee. ROBERT H. SCOTT.

Resolved,—That this letter be entered in the minutes, and that Mr. Scott and Mr. Stewart place themselves in communication with the Board of Trade with reference to the above letter.

The Secretary gave an account of a visit which he had paid to the observatories at Glasgow and Stonyhurst, and described the sites that had been chosen for the various instruments.

The Secretary laid before the Committee a communication which he had received from the Board of Trade, enclosing a letter from M. Le Verrier, of Paris, who had been informed by the Board of Trade that the Meteorological Committee would answer his letter.

The following answer was drawn out by Dr. W. A Miller, and it was resolved that Mr. Stewart should adopt it in communicating with M. Le Verrier:

SIR, Meteorological Office, 2, Parliament Street, 18th February 1867.

YOUR letter of the 18th January, addressed to Mr. Babington, having been referred to the Meteorological Committee by the Board of Trade in this country, I am directed by this Committee, in reply to your inquiry respecting the present discontinuance of storm signals, to forward to you the following documents, namely:

1. A copy of a report of a Committee appointed to consider certain questions relating to the Meteorological Department of the Board of Trade.

2. A copy of a correspondence between the Board of Trade and the Royal Society.

3. A copy of a circular of the Board of Trade, dated 29th November 1866.

These will give you particulars respecting the suspension of the storm warnings.

In reply to your inquiry as to the present organization of the Meteorological Department, I am to inform you that in accordance with the proposal of the Royal Society a Committee has been formed for the conduct of the Meteorological Department, and that Mr. R. H. Scott has been appointed the Director of the Meteorological Office, and to him you are requested to address any scientific correspondence which you may wish to bring under the consideration of the Committee.

The Secretary read the following communications which he had received from the Board of Trade, with a request that he would lay them before the Meteorological Committee:—

A. A letter from the Board of Trade, dated 24th January 1867, enclosing:—
1. A letter addressed by Professor C. P. Smyth to James Greig, Esq., Secretary of the Chamber of Commerce, Edinburgh, deprecating the suspension of storm signals.
2. A longitude and latitude signal table compiled by B. J. Walker Morison, Esq. (Both communicated by James Greig, Esq., to the Board of Trade.)

B. A communication from the Board of Trade containing:
1. A pamphlet by Mr. Baxendell, deprecating the recent suspension by the Board of Trade of cautionary storm warnings.
2. A letter to the Board of Trade from Mr. Muirhead, Secretary to the Local Marine Board, Glasgow, on the same subject.
3. Copies of the replies by the Board of Trade to Mr. Greig and Mr. Muirhead, informing them that their communications had been forwarded to the Meteorological Committee.
4. A letter from the Secretary of the Trinity House, Hull, to the Board of Trade, asking the annual expense of weather telegrams sent from London to their port, with the reply of the Board of Trade to the same.

C. A letter from the Board of Trade, dated 28th January 1867, containing:—
1. A communication received from the Local Marine Board, Dundee, expressing regret at the suspension of the storm warnings, and recommending that they should be continued.
2. A letter from Lieut. J. Wharton, R.N.R., suggesting a system of exhibiting at each port a statement of the weather at neighbouring ports.
3. A communication from E. S. Boyn, Esq., Secretary to the Finance Committee of the Corporation of Penzance, intimating the wish of the Town Council to have that Borough selected as one of the Meteorological stations.
4. Minutes from which it is inferred that the receipt of the previous letters has been acknowledged by the Board of Trade.

D. A letter from the Board of Trade, dated 31st January 1867, containing a copy of a despatch received at the Foreign Office from Her Majesty's Consul General at Naples, reporting a continuance of heavy gales in the Bay of Naples, from 14th to 18th January, which caused considerable injury to shipping.

Resolved,—That the Secretary write to the Board of Trade informing them that he had brought the above communications before the notice of the Meteorological Committee.

The Secretary also reported having received the following communications addressed to the Board of Trade, the receipt of which has not yet been acknowledged by them:—
1. From W. W. Rundell, Esq., Secretary, Underwriters' Rooms, Liverpool, dated January 31st, 1867.
2. From Thos. Browning, Esq., Secretary, Chamber of Commerce, Manchester, dated 10th January 1867.
3. From James Watt, Esq., Provost of Leith, dated 13th February 1867.

All deprecating the discontinuance of the storm signals.

Resolved,—That the Secretary write to the authors of these communications, stating that the Board of Trade had referred their letters to the Meteorological Committee, and that they had in consequence been duly brought before the notice of that Committee.

With respect to the proposed additional accommodation at the Kew Observatory, Mr. De La Rue reported that after consultation with Mr. Beckley instructions have been given to Mr. Wright, architect, of King Street, Cheapside, who is preparing a plan and specifications with a view of obtaining estimates of the cost of the intended building.

Mr. Scott referred to the subject of telegraphing storms to Mr. Matteucci, and it was resolved that he should correspond with Mr. Matteucci on the subject with the view of complying with his wishes.

The Hydrographer agreed to examine Capt. Toynbee's report, while in connexion with it Mr. Scott will be ready to report at next meeting regarding the establishment of clerks.

The Committee then adjourned till Monday, 25th instant, at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 25 *February* 1867.

PRESENT:

General Sabine in the Chair.

Mr. Spottiswoode.	Colonel Smythe.
Mr. De La Rue.	Dr. W. A. Miller.
Mr. Gassiot.	The Hydrographer.

The Director and Secretary to the Committee were in attendance.

The minutes of last meeting were read and confirmed.

In reply to a communication from Mr. Farrer the following memorandum was transmitted as an answer to Colonel Sykes' question.

Memorandum.—The Meteorological Committee are prepared to give to such of the ports as may require it, and be ready to pay half of the expense, such meteorological data in possession of the Committee as those ports may ask for. None have hitherto applied, and until they do so it is impossible to say what the expense will be; but the readiness to pay a portion of the expense will be a good test of the value attached to the data. At present the local exports are likely to be better judges of the local phenomena, and consequently of weather at their own ports, than an expert sitting at Whitehall.

Read,—The following letter addressed to the Secretary by the Board of Trade in reply to a letter written by the Director to the Secretary and laid before last Committee meeting:

SIR, Board of Trade, Whitehall, 25th February 1867.

I AM directed by the Board of Trade to acknowledge the receipt of a letter of the 18th instant and left here by Mr. Scott, requesting the opinion of this Board with regard to certain matters connected with the Meteorological Office, and specified therein under the form of queries.

As respects the first two of the queries, namely, those relating to the registration of documents and the franking of letters, I am to state that the Board of Trade fully concur in the proposed exclusive registration in the Meteorological Office of the letters intended for that office, and that they think that, as a matter of convenience, the franking of letters sent out by the new Meteorological Office may, at any rate for the present, be continued by this Department.

The supplies of stationery, &c. (referred to in query 3) should, this Board think, without doubt be obtained through Her Majesty's Stationery Office.

I am further to state that the Board of Trade are pleased to approve of the list of articles of furniture, &c. which accompanies query 4, and I am to add that your office will now be held responsible for the articles enumerated therein, unless and until this Board may find it necessary, in pursuance of any arrangement with the Board of Works, to call on your Department to give them up. The Board would be glad to receive a copy of the list in question; and in now returning it to you, countersigned as requested, I am to state that they think it as well to observe that no person employed in the Meteorological Office has, or will have, any right to, or vested interest in, any special article or articles of furniture, and that it will be for the Meteorological Committee to give such directions in the matter as they may think fit. If, for any purposes, the Committee or their officers find it necessary to allot any special article of furniture to any person, such an allotment can only be made subject to any future revision or alteration of arrangements the Committee may from time to time judge it necessary to make.

The questions of accounts and petty expenses, and the advance of part of the grant for the commencement of the buildings at Kew, referred to in the remaining queries 5 and 6, will be made the subject of separate communication.

I have the honor to be, &c.
(Signed) THOMAS GRAY,
Asst. Secy.

Balfour Stewart, Esq.,
2, Parliament Street, S.W.

The Director presented a copy of a letter written by him to Mr. Matteucci.

The consideration of the Hydrographer's report on Captain Toynbee's communication was postponed.

The Sub-Committee presented the following report of their proceedings:

The Sub-Committee met on Saturday at 2, Parliament Street, at 3 o'clock. Present —General Sabine, Captain Richards, Mr. Gassiot, and Colonel Smythe.

The question of the proposed salaries to clerks was brought under their consideration, and it was proposed to recommend to the Committee the following scale, contingent upon the continuance of the Committee :—

ANNUAL SALARIES.

Chief Clerk - -	to rise from	200*l.*	by 10*l.* per annum to	250*l.*
Clerk and Book-keeper, 1st Senior Clerk -	„	150*l.*	by 10*l.* „	200*l.*
2nd Senior Clerk -	„	130*l.*	by 10*l.* „	180*l.*
Extra for instruments -		50*l.*	- - -	50*l.*
1st Junior Clerk -	to rise from	100*l.*	by 10*l.* per annum to	150*l.*
2nd Do. do. -	„	90*l.*	by 10*l.* „	150*l.*
3rd Do. do. -	„	78*l.*	by 5*l.* 10*s.* „	100*l.*
Messenger - -				

No rise in the salary of Mr. J. S. Harding, sen., recommended.

Colonel Sykes' question for Monday, the 25th inst., was brought before the Sub-Committee, and Mr. Scott was directed, in the absence of Mr. Stewart, to furnish the President of the Board of Trade with a reply, which has since been modified as above.

Resolved,—That the recommendations of the Sub-Committee be adopted.

Resolved,—That on a re-consideration of Captain Toynbee's letter of January 11th, and of the Committee's reply, they will be prepared, in the event of their continuance in office, to take into consideration his application for an increase of salary at the close of the financial year of 1867, and that a copy of this resolution be forwarded to Captain Toynbee.

Mr. Scott reported that Mr. Simmonds, his present chief clerk, wished to resign.

Resolved,—That his resignation be accepted.

Mr. Scott presented copy of a correspondence with regard to the barometer at Morecambe.

He also gave the substance of a conversation he had had with Mr. Farrer relative to the title of the Department.

Resolved,—That it be called the " Meteorological Office."

Mr. Scott communicated a memorandum regarding aneroids, which was referred to Mr. Stewart, Mr. Scott in the meantime to procure 12.

Mr. Scott mentioned that he had been promised the whole of the information as to the amount of work done by foreign nations in the subject of ocean meteorology, which was obtained by the Government Committee.

Resolved,—That Mr. Scott be requested to put it in form with a view of having it recorded in the Minutes.

Mr. Scott stated that Mr. Edward Whymper is about to start on an expedition to explore Greenland, and that he had applied for the loan of a set of thermometers, with which he might make observations on sea temperatures.

Application granted.

Resolved,—That Mr. Stewart's report of his visit to Glasgow and Stonyhurst be entered on the Minutes as follows :—

On Tuesday, 12th inst., the Secretary visited Professor Sir W. Thomson, at Glasgow. Sir W. Thomson stated that his electrometer was now a very convenient instrument, and he agreed to write a description of it, a copy of which he would lay before the Meteorological Committee.

On the same day the Secretary visited Professor Grant, and saw his observatory near Glasgow.

The position of this observatory appears to be unexceptionable. It stands on an elevation, and is freely exposed to the winds from all quarters. It is at the same time sufficiently removed from the heat of the city to be free from all suspicion of an artificial rise of temperature.

The Secretary suggested that the barograph and thermograph might with propriety be placed in a detached building at present used for an equatorial. It is imagined that as far as regards the barograph, the daily range of temperature would not be excessive in this building, while the thermograph would have an unexceptionable northern exposure.

It was finally resolved that the anemometer should be erected above the centre of the great dome attached to the main building, which is at present out of use, and it would there have an unexceptionable position.

One of Mr. Grant's assistants is ready to come to Kew to receive instruction in meteorology and photography, and it was arranged that another of his assistants should also be

taught photography, so that two assistants should be acquainted with the process at the same time, and a security thus obtained for the continuance of the observations in case of the illness or absence of the regular assistant.

On Thursday, the 14th inst., the Secretary visited Stonyhurst College, and discussed the proposed site for the meteorological instruments.

The barograph will be put in the room built for self-recording magnetographs. This room will have a very small daily range of temperature, and will therefore be an excellent situation. It was proposed to put the thermograph out of a window having a northern exposure on the basement-floor of the astronomical observatory. The room connected with this window will be ultimately used as a calculating room, and will be warmed by a hot pipe running round it. The Secretary does not however imagine that this circumstance will influence the thermometers which will be placed outside.

It was at first proposed to erect the anemometer at a side of the large dome which it is proposed to build in connexion with the astronomical observatory there. The cups would in this case be elevated 4 or 5 feet above the top of the dome, but the windmill vane, which is below the cups, might, it is thought, be influenced by currents of air beating against the dome which might alter the direction of the general body of air, and thus the instrument might be made to record a false direction.

It was ultimately proposed to put the instrument above the centre of a summer house, which position would not be open to the above objection, while the height it would then occupy was considered sufficient.

The Rev. W. Sidgreaves has already received instruction in photography at Kew, but he is willing to come again to Kew if necessary, and to make an arrangement that another of their staff should be acquainted with photography as well as himself.

The Committee then adjourned until Monday, March 4th, at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, 4th March* 1867.

PRESENT :

General Sabine in the Chair.

Captain Richards.	Mr. De La Rue.
Mr. Spottiswoode.	Mr. Gassiot.
Dr. Miller.	Colonel Smythe.

The Director and Secretary to the Committee were in attendance.

The minutes of last meeting were read and confirmed.

The Secretary laid before the Committee letters from the clerks accepting the offers made to them at last meeting.

Their names and positions are as follows :—

Chief Clerk - - -	Vacant.
First Senior Clerk - -	Mr. J. S. Harding, jun.
Second Senior Clerk - -	Mr. Richard Strachan.
First Junior Clerk - -	Mr. Frederic Gaster.
Second Junior Clerk - -	Mr. Charles Harding.
Third Junior Clerk - -	Mr. R. H. Curtis.

Resolved,—That Mr. J. S. Harding, sen., be retained at his present salary of 30*s.* a week.

The following memorandum was agreed to in reply to a suggestion of Mr. Bass, in the House of Commons, with regard to the propriety of having a station in the midland counties :—

Memorandum,—With respect to Mr. Bass' suggestion, the Committee see no reason for having at present any other stations than those which they now have.

Resolved,—That Mr. Stewart send copies of the report of his journey to Glasgow and Stonyhurst to Sir W. Thomson, Professor Grant, and the Rev. W. Sidgreaves.

The consideration of Captain Toynbee's report was postponed.

General Sabine presented a correspondence between Mr. St. Aubyn and himself relative to a station at Penzance.

Resolved,—That it be entered on the minutes as follows :—

House of Commons, February 25, 1867.

Mr. St. Aubyn presents his compliments to Lt.-General Sabine, and begs to say that he has been requested by the Corporation of Penzance to lay before him the claims of that place to be one of the new Meteorological Stations. The Board of Trade, who were applied to in the first instance, have referred the application to the Committee of the Royal Society, or Mr. St. Aubyn would not have troubled General Sabine on the subject.

Lt.-General Sabine, Royal Society, Burlington House.

Reply to the above :—

The Royal Society, Burlington House, London, W.
February 27, 1867.

Sir,

If you will refer to the Report of the Meteorological Committee of the Board of Trade (one of the *blue books*), you will see in Appendix, page iii. to v., a letter from the President of the Royal Society to the Board of Trade, dated June 15th, 1865, recommending the establishment of *eight* Meteorological Stations distributed over the area of the United Kingdom to carry on systematic observations on an uniform plan with continuously self-recording instruments—and that Falmouth is recommended as one of those stations, to be conducted under the supervision of the Cornwall Polytechnic Institution. Falmouth was thus selected after consultation with Mr. Robert Were Fox, who has long been a zealous co-operator with the Royal Society in Magnetism and Meteorology, and has for many

years taken a leading part in the councils and direction of the Polytechnic Institution. The authority for the establishment of the stations recommended has been received, and the arrangements at and for Falmouth are in progress. I have made a note of your wishes in respect to Penzance, which, were not Falmouth already adopted, might be, as far as its locality is concerned, a very suitable position.

I am, Sir, your obedient Servant,

John St. Aubyn, Esq. M.P. (Signed) EDWARD SABINE, P.R.S.

Mr. Scott having reported that he had examined the foreign correspondence in the office, and had found that it related principally to storm warnings :—

Resolved,—That he be requested to make an abstract of that portion of it which it may be desirable to lay before the Committee.

Mr. Scott reported that he had made inquiries as to the instruments which have been in the hands of the clerks and others, in case the Committee might wish that those instruments which are not employed in their service should be recalled.

Resolved,—That Mr. Scott make application to recover such instruments.

The Secretary presented a letter which he had written to Mr. Scott suggesting a cheap variety of Robinson's anemometer, to be used at the out-stations, in order to replace the system of guessing at the strength of the wind.

Resolved,—That Mr. Stewart be authorized to have one made at Kew Observatory.

The Secretary stated that he had received a visit from Mr. Charles Fox, of Falmouth, who thought it likely that a building on the top of the bowling green there might be made into an observatory.

The Committee then adjourned until Monday, 11th instant, at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 11*th March* 1867.

PRESENT:

General Sabine in the Chair.

Dr. Miller.	Mr. De La Rue.
Mr. Gassiot.	Mr. Spottiswoode.
Colonel Smythe.	

The Director and Secretary to the Committee were in attendance.

The minutes of last meeting were read and confirmed.

The consideration of Captain Toynbee's report was postponed.

Mr. Scott presented the following report regarding the foreign correspondence in the office having reference more particularly to storm warnings:—

GENTLEMEN, March 11, 1867.

HAVING examined the correspondence referred to in your minutes of the 25th ult. and 4th inst., I have prepared the following account of it, with a view to its being printed.

The first two letters are from the Board of Trade, and addressed to the Under Secretary of State, Foreign Office.

Office of Committee of Privy Council for Trade,
Whitehall, December 22, 1865.

SIR,

REFERRING to the Report of the Meteorological Conference, held at Brussels in the year 1854, it will be seen that it was the object of that Conference to provide for the collection and discussion of meteorological observations at sea. And one of the things which that Conference recommended was the mutual intercommunication of any results which might be produced by any public departments under the direction of the several Governments which took part in the Conference. See Parliamentary Paper, 4, sess. 1854.

The Board of Trade believe that all results, *i.e.*, all published documents produced by the Meteorological Department of the Board of Trade, have been from time to time sent by the late Admiral Fitz-Roy to officers holding analogous positions in foreign countries, but they need hardly say that they are ready to send additional copies to any of those Governments if desired.

On the other hand they believe that the results of the discussion of similar observations, made under the direction of the Foreign Governments who took part in the Brussels Conference, have generally been communicated to Admiral Fitz-Roy. But as the whole subject, so far as this country is concerned, is now under discussion, the Board of Trade would be glad if they could be furnished officially with all publications of the results of meteorological observations made at sea, which may have been printed and published under the direction of the Governments in question since the date of the Conference.

The nations which took part in the Conference are Belgium, Denmark, France, Netherlands, Norway, Portugal, Russia, Sweden, United States. And the Board of Trade request that you will move the Earl of Clarendon to ask the Governments of these countries to furnish the documents in question.

I have, &c.
(Signed) T. H. FARRER.

Board of Trade, Whitehall, London,
December 30, 1865.

SIR,

REFERRING to my letter of the 22d December, and to your reply of the 28th instant, relating to certain particulars which the Board of Trade are desirous of obtaining from the Governments who took part in the Meteorological Conference at Brussels in 1863*, I am now directed to state that, in consequence of inquiries into the functions of the Meteorological Department of the Board of Trade made by a committee recently appointed for the purpose, it has become desirable to obtain, in addition to the particulars previously asked for, an answer to the following questions, viz., whether any of the Governments who were represented at the Brussels Conference have established any system of forecasting or predicting probable weather.

* So in original draft.

If so, whether that system extends to daily forecasts of probable weather, or is confined to the prediction of occasional storms. If confined to the prediction of occasional storms, is it confined to those cases in which storms are known by telegraph to exist elsewhere, or does it extend to predicting probable storms, of the actual existence of which there is no positive information.

If any system of foretelling weather, either daily or occasional, has been established, is it still continued? and if discontinued, for what reason?

The Board of Trade will be obliged if Lord Clarendon will have the goodness to cause the above questions to be submitted to the Governments who took part in the Brussels Conference, viz., those of Belgium, Denmark, France, Norway, Portugal, Russia, Sweden.

I am, &c.
(Signed) T. H. FARRER.

United States.—An application of a similar nature had been addressed to the United States Government, a short time previous to the date of the above letters, and from it a reply was obtained, dated Dec. 29, 1865, stating that for the present the publication of meteorological data had been suspended, but that the Chief of the Bureau of Navigation would gladly co-operate with the British Authorities in all meteorological publications, as soon as permission had been obtained from Congress to resume the work. On the 29th January, 8th February, and again on the 7th of May, communications were made by the United States Government, forwarding as complete a series of their meteorological publications as it was in their power to furnish.

Netherlands.—On the 29th January the Government of the Netherlands forwarded a complete set of their meteorological publications, and on the 29th of May they sent a reply to the questions embodied in the letter, from which I extract the following passage:—

Le Département de l'Intérieur auquel a été communiquée cette demande a fait parvenir au S.S. Ministre des Affaires Etrangères les exemplaires de quelques opuscules qu'il a l'honneur de joindre à la présente, savoir:—

1. Eenige regelen voor aanstaande weersveranderingen in Nederland, voornamelijk in verband met de dagelijksche telegrafische seinen, door Dr. Buys Ballot, 1860.
2. The foretelling of the weather in connexion with meteorological observations, by F. H. Klein; together with a description of the telegraphic warning system, introduced in the Netherlands, June 1860, as proposed by the Director of the Royal Netherlands Meteorological Institute, Professor Buys Ballot, translated from the original Dutch, by A. Adriani, 1863.
3. Toelichting van de gronden waarop stormen verwacht worden en waarop het hijschen van storm-signalen steunt, door Dr. Buys Ballot, 1864.

Le susdit envoi a été accompagné des informations suivantes:—

La communication de l'état du baromètre, de la température, de la direction et de la force du vent aux établissements maritimes et ports Néerlandais date déjà du 1er Juin 1860, en vertu d'une disposition du Ministre de l'Intérieur du 21 Mai de cette année. Dès cette époque l'Institut Météorologique reçut des communications analogues de Paris, Brest, Havre, Portsmouth, Plymouth, et West Hartlepool, et plus tard de Yarmouth et Falmouth, et depuis le 15 Septembre 1865 il en a reçu également de Penzance, Valentia, Nairn, et North Shields.

Dès le début le Directeur de l'Institut proposa d'annoncer publiquement par signaux de pavillons ce qu'on attendait de ces communications. Cette proposition ne fut pas adoptée immédiatement. Dans le principe ces communications furent seulement transcrites sur un écriteau, et déposées chez les maîtres de port pour l'inspection du public; en outre, les officiers de la marine se donnèrent la peine de les porter, en les expliquant à la connaissance des marins, et les firent connaître également aux navires qui passaient Flessingue. Mais comme elles ne furent pas publiées officiellement il arriva quelquefois qu'elles ne parvinrent pas à la connaissance des intéressés. C'est à cette circonstance qu'il faut attribuer peut-être que dans le tempête où a péri le Royal Charter, un navire Néerlandais a couru de grands risques. Du moins, ce bâtiment n'aurait pas quitté le port si le commandant eut connaissance des communications reçues.

Lorsqu'ensuite on passa en Angleterre des mesures de transition à l'annonce officielle d'après le système de l'Amiral FitzRoy, on suivit autant que possible le même système dans les Pays Bays quant aux signaux publics d'avertissement, afin de prévenir que dans les différents pays les mêmes signaux ne reçussent une signification différente.

Les avertissements ont été déduits invariablement dès le début des susdites communications, lesquelles comprennent aussi, quand il s'agit d'endroits situés à l'intérieur, des indications sur l'état du baromètre de la veille au soir; la déduction se fait d'après la règle communiquée en 1857 par le Directeur Buys Ballot à l'Académie des Sciences, rapportée par les Comptes-Rendus hebdomadaires et détaillée un peu plus amplement dans les rapports et communications de l'Académie Royale des Sciences à Amsterdam (Verslagen en mededeelingen van de Koninklijke Akademie van Wetenschappen te Amsterdam, deel XII., bladz 57.) Dans les opuscules précités, Nos. 1, 3, il est démontré que les expériences faites depuis 1857, ont prouvé la justesse de cette règle. L'opuscule No. 2 fut présenté et expliqué par Mr. Buys Ballot dans une séance de l'Association Britannique à Newcastle-on-Tyne, explication qui se trouve également dans un article de M. Buys Ballot, dans le numéro ci-joint du "Civil Engineer and Architects Journal" du mois d'Août 1865.

La susdite règle est basée principalement sur la différence simultanée de l'état du baromètre en différents endroits, et ce, indépendamment de la présence ou de l'absence actuelle d'une tempête dans un lieu quelconque. Les "Transactions of the Royal Society of Edinburgh, vol. xxiv." publiées récemment, contiennent un mémoire de Mr. A. Buchan sur les tempêtes de Novembre 1863. Dans cet

écrit, dans l'opinion de M. Ballot, le meilleur de ceux qui ont été publiés depuis les mémoires de Lloyd et Loomis, la règle dont il s'agit se trouve pleinement confirmée. Le dit article donne aussi lieu à la conviction, que, pour la plus grande partie, les tempêtes se font sentir au premier lieu dans l'ouest, dans une direction plus méridionale, d'où il resulte que la ligne actuelle d'observation se dirige par Lisbonne, Corunna, Penzance, l'Ile de St. Mary, ensuite par l'Irlande et la côte ouest d'Ecosse; de sorte que l'Angleterre surtout est appelée à avertir l'Europe contre les tempêtes. De là nait tout naturellement l'idée qu'il incomberait principalement à l'Angleterre d'étendre encore davantage les lieux d'observation. Il serait ainsi à désirer que sur les plateaux de l'océan Atlantique, à une distance de deux cents milles Anglais les uns des autres, furent deposés quelques baromètres, dits " self-" registering barometers," reliés à la côte par des cables télégraphiques.

Dans le principe tous les ports Néerlandais eurent l'avantage de recevoir journellement les communications. Par ce moyen, quand on connaissait bien les règles adoptées et qu'on observait l'état du ciel et de la mer, non seulement on était averti de l'approche d'une tempête, mais on avait encore l'occasion de présager la direction probable du vent du lendemain. Plus tard on s'est départi de la transmission de ces nouvelles à cause des frais, et ce ne sont aujourd'hui que les établissements de Flessingue, Nieuwe Diep, ensuite Amsterdam et Rotterdam qui chaque matin reçoivent régulièrement, et en cas de danger aussi le soir, une communication complète tandis que les autres ports ne reçoivent de communications d'Utrecht que de temps à autre, et seulement pour les avertir de l'imminence d'une tempête.

Le Directeur de l'Institut Météorologique est d'avis que, si les frais ne s'y opposent pas, la transmission régulière des communications à tous les endroits, où il y a des personnes assez intelligentes pour les comprendre, est préférable à la publication officielle de l'observatoire central ; le dernier mode devant être réservé pour des cas difficiles. On comprend qu'il est impossible de déterminer si une tempête planera sur le nord ou le sud du royaume, et pour cette raison il faudra laisser quelque influence aux indications locales, aussi les règles sont si simples qu'on apprend bientôt à les comprendre et à les appliquer.

France.—On the 13th February the French Government sent a reply to the questions relating to Marine Meteorology, and on the 14th April an answer to the queries as to storm warnings, addressed by M. Le Verrier to the Minister of Public Instruction, from which I have omitted the portions which do not immediately concern the points under consideration.

N'eût-on à considérer ces demandes qu'à un point de vue exclusivement scientifique, il serait encore assez grave de se prononcer sur le meilleur système d'avertissement; car les questions posées par Monsieur l'Ambassadeur d'Angleterre exigent une discussion complète, nous sommes d'ailleurs liés avec les pays voisins par les documents que nous en recevons et par ceux que nous leur rendons. Tel pays nous demande de lui donner des avertissements formels sur le mauvais temps; tel autre ne nous réclame au contraire qu'un résumé de l'Etat Européen présent. N'avons nous pas enfin à compter avec les embarras intérieurs inséparables de toute organisation nouvelle, avec des obstacles de toute nature rencontrés depuis dix ans et tels que quand ils auront été définitivement ecartés, nous pourrons donner au service météorologique cette épigraphe, *Tantæ molis erat.*

Nous acceptons toutefois de faire une reponse précise aux questions du Gouvernement Anglais dont la bienveillance assure à nos travaux météorologiques un concours cordial et sans limite. Notre exposé donnera d'ailleurs satisfaction aux demandes que l'administration Autrichienne nous adresse de son côté. Il est d'autant plus nécessaire de répondre à l'Angleterre qu'un de nos fonctionnaires vient de publier un traité où il expose (sous le nom de l'observatoire autant qu'il est en lui) et maintient un système absolu de prévisions qui n'avaient été inauguré que faute des ressources nécessaires pour en agir autrement et auquel j'ai renoncé après de longues discussions avec les hommes compétents. Mais il faut que cette réponse soit complète. L'Administration Anglaise ne se contenterait pas de demi-raisons, qui ne seraient dignes ni d'elle ni de nous. Nous ne devons pas mettre à la charge de notre science Française des difficultés d'ordre administratif. Si donc vous le permettez, Monsieur le Ministre, j'examinerai successivement:—

1°. Le service des avertissements à un point de vue purement scientifique.

2°. L'organisation pratique qui en découle.

1°. En proposant il y a dix années environ le système d'avertissements à donner aux ports, nous admettions que le mauvais temps venant à se montrer en un point de l'Europe, sa marche serait attentivement surveillée de manière à prévenir en temps utile, par le télégraphe, les régions menacées. Tel était aussi le sens d'une réponse faite le 16 Janvier 1860 au Ministre de la Marine et d'une lettre adressée le 4 Avril de la même année à mon illustre collégue de Greenwich.

" Signaler, disions-nous, un ouragan dès qu'il apparaîtra en un point de l'Europe, le suivre dans sa " marche au moyen du télégraphe, et informer en temps utile les côtes qu'il pourra visiter, tel devra " être le dernier résultat de l'organisation que nous poursuivons."

Dans la Commission mixte réunie au commencement de la même année, j'exposai tous les détails d'exécution avec les plans et cartes mobiles nécessaires.

Les ressources matérielles indispensables ne nous furent pas accordées.

Plus heureux, Monsieur l'Amiral Fitz-Roy, ayant obtenu un subside du Parlement, commença plus tard un système d'avertissements organisé autrement. Cet éminent météorologiste entreprit en se fondant sur les observations recueillies chaque matin, de prévenir les côtes du Royaume Uni du temps probable pour le lendemain. Des signaux furent élevés sur toutes les côtes pour transmettre les avis de Mr. l'Amiral Fitz-Roy.

Vers le milieu de l'année 1863 votre Excellence prit connaissance de l'ensemble de cette situation et dès qu'elle fut convaincue qu'il y avait là une question importante pour la science et la marine, elle nous invita à marcher en avant en nous assurant de tout le concours dont elle pourrait disposer.

L'organisation d'un service aussi compliqué, et qui demande un personnel assez nombreux et aguerri, ne peut toutefois s'improviser, et, en attendant, on se borna au système de prévision inauguré par

Mr. l'Amiral Fitz-Roy, système plus simple et moins pénible pour ceux qui sont chargés de le mettre en pratique.

Quelques bons résultats furent obtenus et toutefois des plaintes se firent entendre ; plaintes mal fondées sur beaucoup de points, mais au milieu desquelles se trouvait cependant un avis dont, moyennant quelques réserves, il fallait tenir compte.

Etait-il possible, demandait-on, d'arriver à prévoir le temps jusqu'à 30 heures à l'avance, avec une certitude telle que les navires soient toujours avertis en cas de mauvais temps? N'y aurait il pas trop de circonstances où, dans l'impossibilité de se prononcer d'une manière claire et précise, on se tiendrait dans un système d'annonces vagues et indécises?

" Revenez donc, me disait-on publiquement, revenez à votre premier système, annoncez les gros " temps, mais les vrais gros temps; c'est ainsi seulement que vous rendrez des services sérieux à la " marine."

Personne plus que moi n'aurait dû être disposé à revenir au système que j'avais d'abord proposé. Mais, si je ne le fis pas, c'est que j'y voyais un inconvénient.

La pratique a en effet montré que nos côtes de la Manche et de l'Océan sont souvent abordées les premières par l'Ouragan. Si nous en exceptons l'Angleterre, le reste de l'Europe n'est envahi qu'ultérieurement et de plus en plus tard à mesure que l'on s'avance vers l'est. D'où il résulte qu'un système d'avertissement qui ne fonctionnerait que lorsque la tempête a déjà été constatée quelque part, serait excellent pour l'est de l'Europe, mais laisserait à désirer pour nos propres côtes.

A cette époque d'ailleurs, notre personnel était encore incomplet. Le système de prévision absolue introduit par l'Amiral Fitz-Roy n'avait point été expérimenté pendant un temps suffisant. Il convenait d'attendre.

Mais depuis lors deux années se sont écoulées. Le système dont il s'agit a été suffisamment éprouvé il a donné lieu à un examen et à des discussions tantôt publiques, tantôt privées. Il est temps de se prononcer definitivement et de mettre sérieusement en pratique le système que la science et l'expérience auront recommandé. L'intéret de la marine l'exige impérieusement.

Or, si l'organisation que j'avais d'abord proposée me parait offrir un inconvénient qui ne permet pas d'y revenir complètement, le système de prévisions absolues donne prise à des difficultés qui nous défendent de le conserver en son entier.

L'expérience nous apprend que dans notre climat, le mauvais temps est presque toujours accompagné d'une dépression barométrique dont le centre, après avoir traversé une plus ou moins grande partie de l'Angleterre, aborde les côtes de l'Europe. L'existence de cette dépression nous est connue par les observations du baromètre lorsqu'elle se trouve encore fort loin en mer ; mais il n'en est pas de même de la route qu'elle tiendra. Nous ignorons si le centre de la tourmente se dirige sur les côtes de France; ou sur celles d'Angleterre, ou s'il passera au nord des Iles Britanniques et cependant c'est là ce qu'il faudrait connaître pour prédire avec quelque sécurité et à chaque port le temps du lendemain.

Quel parti prendre en pareil cas? mettre tout au pire et annoncer mauvais temps? ou bien, espérant que la tourmente ira se perdre dans des latitudes élevées, doit-on signaler beau temps? Dans l'un et l'autre cas, ce serait se prononcer au hazard. Un esprit sérieux et consciencieux n'en agira pas ainsi; il fera passer dans la dépêche l'indécision que la force des choses laisse dans son esprit et transmettra un avis sans utilité pour la marine.

Ainsi donc, d'une part les avis donnés après l'arrivée effective d'une tempête sur un point des côtes Européennes pourraient être trop tardifs. D'un autre côté dans le système de la prévision absolue faite la veille, il est souvent trop tôt pour formuler un avis sérieux. La pratique nous conduit donc vers une organisation intermédiaire, résumant dans ce qu'elles ont de positif les opinions des hommes les plus compétents.

Nous continuons à recevoir chaque matin les observations faites à 8 heures de matin en hiver, à 7 heures en été, dans 20 postes Français et dans 40 etrangers.

Nous recevons le soir 15 observations faites à 6 heures du soir, d'une part dans les 12 postes télégraphiques organisés de concert avec Mr. de Vougy, de l'autre à la Corogne, à Utrecht, à Valentia.

Cette dernière série est propre à contrôler la première; elle constate le mouvement, qui depuis le matin s'est opéré dans l'atmosphère, sur les régions qu'il importe surtout de considérer.

Lorsque aucune perturbation sérieuse de l'atmosphère ne nous menace à bref délai, l'étude des observations du matin jointe à la considération des observations de la veille au soir permet, en général, de prononcer sur la journée du lendemain et d'avertir les ports qu'ils n'ont rien à redouter. Si un tel avis n'est pas le plus important que les ports puissent recevoir, il permet toutefois aux marins d'agir avec une entière sécurité; et, d'une autre part, cette étude journalière est indispensable pour qu'on ne se laisse pas surprendre par l'arrivée du mauvais temps.

Si, au contraire, la situation menace de se troubler on pourra être embarrassé pour conclure nettement, les inconvénients d'un service de prévision absolue se présenteront alors, puisqu'on ne pourra transmettre aux ports que l'indécision où l'on se trouvera, sans leur fournir aucun moyen de la lever.

Nous estimons que dans ce cas un service supplémentaire doit être fait le soir, en se basant sur les 15 observations de 6 heures ; service qui permet alors de multiplier les avis, de les donner de 12 heures en 12 heures pour ainsi dire, et d'arriver ainsi à l'exactitude que demande la securité de la marine.

On objecte que les dépêches envoyées à cette heure tardive ne trouveraient personne pour en prendre connaissance. Nous sommes persuadés du contraire.

L'expéditeur de la dépêche du matin, inquiet sur le temps du lendemain, se trouvant dans l'impossibilité de prononcer avec certitude, avertira franchement de cette situation et annoncera une dépêche supplémentaire pour le soir. On peut compter que les marins intéressés et qui seraient tentés de sortir avec la marée du soir ou de la nuit, voyant un service d'avertissements fait avec ce sérieux auront soin de se trouver à l'arrivée de la dépêche annoncée, et qu'ainsi elle aura porté tous les fruits qu'on en attendait.

Je suis convaincu, Monsieur le Ministre, que dans ce système mixte qui tient à la fois de celui que j'avais proposé à l'origine et du système suivi par l'Amiral Fitz-Roy, réside tout l'avenir d'un service météorologique utile à la marine. J'insiste fortement pour qu'une organisation fondée sur ces bases, fonctionne régulièrement, d'une manière continue, et sans trouble.

Pour achever de définir nettement le service ainsi entendu, je joins à cette lettre le règlement concernant nos avertissements aux ports Français et étrangers. Il est conforme au plan presenté à la commission du corps législatif. S'il s'y trouve quelques parties dont l'exécution laisse à désirer, ou que la force des circonstances ait fait différer, je ne négligerai rien pour y remédier.

Nous avons encore à dégager la promesse faite par votre Excellence à MM. les Préfets de donner à ceux d'entre eux qui le jugeraient utile des avis météorologiques pouvant intérresser l'agriculture (Lettre du 14 Août 1865). Je traite de ce qu'il convient de faire dans une lettre spéciale jointe à celle-ci.

II. Le service des avertissements constitué comme nous venons de l'exposer ne saurait être exact qu'à une condition. C'est qu'il reste constamment dans les mêmes mains, matin et soir, pendant un nombre de jours suffisant. Si le fonctionnaire qui en est chargé était changé chaque jour, il n'aurait pas une connaissance suffisante des mouvements précédents de l'atmosphère sur lesquels il doit baser son appréciation ultérieure. A plus forte raison ne pourrait-on placer le service du matin et celui du soir dans des mains différentes. Celui qui a envoyé la dépêche du matin dans des circonstances qu'il a parfaitement étudiées est seul capable de la rectifier au besoin par la dépêche du soir.

Le service devient alors il est vrai fort lourd aux époques de mauvais temps, et il ne parait pas possible de le continuer généralement au même fonctionnaire pendant plus d'une semaine.

Quatre fonctionnaires sont indispensables pour assurer la régularité du service contre toute interruption. S'il arrive en effet que l'un d'eux vienne à s'eloigner définitivement, on se trouve réduit à trois pendant une année, temps nécessaire pour former un nouveau collaborateur. Dès que l'un de ceux-ci est absent, par congé ou par cause de maladie, il ne reste que deux personnes capables de faire un bon service, nombre strictement suffisant puisqu'on ne peut pas imposer à un fonctionnaire un service continu du matin et du soir.

L'observatoire a d'ailleurs à conduire un grand nombre de travaux météorologiques dont une partie tiennent au développement scientifique du système d'avertissements, et qui tous, nous l'esperons, feront quelque honneur à notre pays. On arrêterait l'essor de ces études en nous réduisant à trois fonctionnaires.

Je dois enfin signaler une condition essentielle et sans laquelle ce rapport ne serait pas complet.

Si dans les travaux purement speculatifs l'indépendance absolue de ceux qui les accomplissent est acceptée, il n'en saurait être ainsi dans des travaux d'ensemble qui, pour être fructueux, necessitent le concours d'un grand nombre de personnes, et dont l'administration complexe a été laborieusement organisée. Une direction unique des travaux est indispensable.

Service Météorologique.

Avis météorologiques expédiés par l'observatoire :—

I. Dépêche aux ingénieurs du service hydraulique de la Meuse, à Bar-le-Duc.

Ce télégramme comprend un résumé de la situation atmosphérique du jour. Il renferme une indication de la distribution des pressions.

II. Dépêches aux ports de France.

Les télégrammes addressés aux ports Français renferment un résumé de la situation atmosphérique générale interessant les côtes de France. Lorsque des mauvais temps sont à craindre, avis en est donné aux ports ménacés. Ces avis peuvent être expédiés dès que la situation devient douteuse. L'annonce de la tempête est alors préparée par plusieurs dépêches successives.

Les ports de France qui reçoivent les dépêches météorologiques sont au nombre de 73, conformément au tableau arrêté avec l'administration des lignes télégraphiques.

Lorsque les dépêches doivent être différentiées, la 1ère en vertu de la même convention, s'étend de Dunkerque à Granville ; la 2ème de Saint-Malo à Quimperlé ; la 3ème de Saint-Mazaire à Bayonne ; la 4ème de Port Vendres à Menton ; la 5ème concerne la Corse.

Lorsque la situation est douteuse, une dépêche supplémentaire peut-être expédiée le soir. Il est utile de l'annoncer dans la dépêche du jour.

III. Dépêches pour l'Etranger.

Ces dépêches comprennent deux parties :

1°. Une indication de la distribution des pressions barométriques. Le 1er chiffre 7 est supprimé. On transmet 65 pour 765 millimètres.

Le chiffre de la pression précède les noms des lieux auxquels elle se rapporte. Ainsi 65 Galway, Londres, Berlin, Moscou désigne la série des points où la pression est de 765 $^{m}/_{m}$. Les pressions sont transmises en commençant par la plus basse.

2°. Une indication des circonstances atmosphériques, intéressant plus spécialement la région à laquelle s'adresse la dépêche est expédiée : 1°. à Florence, 2.° à Rome, 3°. à Berne, 4°. à Lisbonne.

Cette indication est également addressée aux stations suivantes en y joignant pour les cas de mauvais temps probable un avis pareil à ceux qui sont adressés aux côtes de France :

Vienne, pour les côtes de l'Adriatique de Venice à Lessina.

Bruxelles et Utrecht } pour les côtes de la Mer du Nord, de Dunkerque à Hambourg.

Pétersbourg { pour les côtes orientales de la Baltique. / id. id. Russes de la Mer Noire.

Stockholm, pour les côtes de Suède.

Christiania, pour les côtes de Norwége.

Madrid, pour les cotes est de Tarifa à Barcelonne.

Les télégrammes transmis à la France ou à l'étranger sont donc au nombre de 15, savoir.

*1°.	France,	dépêche	pour	Bar-le-Duc.
2°.	id.	id.	id.	Dunkerque à Granville.
3°.	id.	id.	id.	Saint Malo à Quimperlé.
4°.	id.	id.	id.	Saint Nazaire à Bayonne.
5°.	id.	id.	id.	Port Vendres à Menton.
6°.	id.	id.	id.	Corse.
*7°.	Etranger	id.	id.	Côtes d'Italie transmise à Florence et Rome.
8°.	id.	id.	id.	Côtes de l'Adriatique transmise à Vienne.
*9°.	id.	id.	id.	la Suisse transmise à Berne.
10°.	id.	id.	id.	Côtes de la Mer du Nord transmise à Bruxelles et Utrecht.
11°.	id.	id.	id.	Côtes de la Baltique et Mer Noire transmise à Pétersbourg.
12°.	id.	id.	id.	Côtes de Suède transmise à Stockholm.
13°.	id.	id.	id.	Côtes de Norwége transmise à Christiania.
*14°.	id.	id.	id.	Côtes de Portugal transmise à Lisbonne.
15°.	id.	id.	id.	Côtes est d'Espagne transmise à Madrid.

Les dépêches 1, 7, 9 et 14 marquées d'un astérique ne comprennent que des renseignements sur l'état actuel de l'atmosphère.

Belgium.—On the 24th March the Belgian Government sent their reply, containing the following passages:—

A la suite du Congrès qui s'est tenu à Bruxelles en 1853 les capitaines Belges ont été invités à recueillir des observations météorologiques d'après le système préconisé et adopté dans cette réunion.

Le directeur de l'établissement précité s'est borné à étudier par de persévérantes observations l'état du ciel, afin d'indiquer ainsi d'après la loi des probabilités la réproduction des mêmes phénomènes à des époques determinées. Cette étude fut commencée dans de longues proportions avant 1841. La Belgique en eut l'initiative, et les résultats obtenus ont été utilisés plus d'une fois et jusque dans ces derniers temps par les savants étrangers.

Votre Excellence trouvera ci-joint un exemplaire du mémoire de M. Quetelet sur les variations périodiques de la température et un exemplaire du résumé des observations météorologiques à des époques déterminées.

Le système d'observations mis en pratique à l'Observatoire Impérial de Paris n'est à vrai dire qu'une extension hypothétique donnée à ces premières études. La Belgique participe à ce système d'observations qui ne peuvent être faites alors qu'il s'agit de tempêtes que dans les ports de mer, et particulièrement à Ostende.

En outre, des instruments météorologiques ont été installés à la station du chemin de fer du Nord à Bruxelles et les indications recueillies par les télégraphistes de l'état sont immédiatement transmises chaque jour à des heures déterminées à l'Observatoire Impérial de Paris.

Russia.—On the 7th April a letter was despatched by the Russian Government; the reply runs as follows:—

Le Ministre de la Marine prenant en considération le Compte Rendu de la Conférence de Bruxelles en 1853, a introduit dans les navires de la flotte une forme identique d'un Journal Météorologique, et les navires qui naviguaient depuis dans les océans ont transmis un grand nombre de ces journaux exactement rédigés.

Une partie de ces journaux a été envoyée à l'Observatoire de Washington, à la demande du Lieut. Maury, pour en puiser les données qui se rapportent aux cartes des vents dans les océans. La guerre d'Amérique ayant mis fin à la carrière tant utile que scientifique du Lieut. Maury les journaux météorologiques qui ont été transmis depuis par les navires de la flotte peuvent être communiqués au Département Météorologique de l'Angleterre, afin d'y recueillir tous les renseignements utiles qu'ils renferment, dans le cas où le Gouvernement de la Reine temoignerait le désir.

Quant aux observations météorologiques faites dans nos mers intérieurs, les travaux qui les concernent n'ont commencé que depuis l'année dernière, et le résultat de ces travaux ne forme actuellement qu'une seule carte imprimée des vents du Golfe de Finlande pour le mois de Juillet. Les cartes pour les mois suivants seront bientôt également imprimées et pourront être envoyées en Angleterre, soit par l'entremise de l'Ambassade de la Reine, soit directement à l'institution à laquelle ces cartes sont nécessaires.

Portugal.—On the 15th June the Portuguese Government replied, and the following is a translation of a portion of their communication:—

[Translation.]

Extract from a letter from the director of the Meteorological Observatory of the Infante D. Luiz:—

In compliance with your Excellency's orders conveyed to me in a despatch dated the 19th ult., I have the honour to forward herewith to your Excellency one copy of each of the publications asked for by Her Britannic Majesty's Minister, namely:—

"Explanatory Notes upon the Meteorological Observations at Sea, 1856."

"Winds and Currents in the Gulf of Guinea."*

"Force of the Trade Winds in the Atlantic Ocean, 1865."†

"Storm of 13th December, 1864."‡

* Translated into French, in 1862, and published by the "Depôt des Cartes et Plans."

† Published in the Nautical Magazine, in Dec. 1862, and in M. Ploix' work, in 1863.

‡ This publication was also based upon the observations made on board several English ships, forwarded by the late Admiral FitzRoy.

Under the title of Maritime Meteorology, the following have also been published in the annals of the observatory from 1864-65:—

"Considerations upon the Routes in the Atlantic Ocean."

"Description of the Route to Brazil and Angola, with an Abridgment of the Meteorological Observations made on Board."

With respect to the nautical meteorological observations, I must add:—

I. That on board of almost all the vessels of war, and on board of some merchant ships, the meteorological observations are carried on in accordance with the instructions issued by this observatory, and with the plan adopted at the Congress of Brussels.

II. That when Mr. Maury was at the head of the National Observatory, at Washington, the results of these observations were forwarded by this institution, of which I am the director, to that observatory. Since 1862, however, the usual practice has been to keep in our archives these works with a view to future investigations, and only forwarding a few copies abroad when asked for. Lately several of these have been sent by order of the Marine Department to the observatory at Paris.

III. That other articles upon maritime meteorology as well as the continuation of the annals of the observatory are ready for printing.

IV. That posts have been lately established at Funchal (Madeira), Ponta Delgada (St. Michael's), Angra (Terceira), S. Thiago (Cape de Verde), and the observations made at these posts will be of great use for studying maritime meteorology.

With respect to the second part of the note, I have the honour to state to your Excellency:—

I. That up to the 24th Oct., 1865, we published daily the notice of the probable weather for the next day as received from the Imperial Observatory at Paris.

II. That after the Imperial Observatory at Paris ceased to send the notice of the probable weather we have published regularly, since the 1st Dec. of that year, a notice of the probable weather for the next day, ordering this notice to be posted every day at the Exchange, &c.

III. That the probabilities of the weather are calculated upon the reports received from the meteorological posts, and with reference to the Paris Bulletin, whenever it is received in time.

Denmark.—On the 30th July the Danish Government stated that no special publications bearing on marine meteorology had been issued by the Marine Department, but that the data obtained by Danish vessels had been forwarded to Washington from time to time. Denmark has as yet taken no steps as to the issue of storm signals.

Sweden and Norway.—On the 1st August a reply was sent from Stockholm. No publications of meteorological data have been issued by the Marine Department. In Sweden observations are made regularly at several coast stations, but they have never been used for calculations as to weather. The notices of approaching storms forwarded by the Imperial Observatory at Paris are transmitted to the authorities at the different ports. In Norway, the despatch goes on to say, "Quant à la prediction des tempêtes "on s'est borné jusqu'à présent à faire des observations à différents endroits dans "l'intérieur et sur la côte, et ordinairement ces observations ont été télégraphiées aux "ports de mer les plus importants, où elles ont été affichées pour l'information du "public."

The above is the last despatch of those which have been placed in my hands.

Your obedient servant,

ROBERT H. SCOTT,

Director.

Mr. Scott reported that the Sub-committee met at 2, Parliament Street, on Wednesday last, and took into consideration the present condition of the Daily Weather Reports and it was determined to recommend to the Committee to make an inspection of the existing telegraphic stations. He suggested that he should visit these ports in company with Captain Toynbee when necessary.

Resolved,—That Mr. Scott make arrangements for this purpose.

Resolved,—That Mr. Stewart make a report regarding the state of preparation of the self-recording instruments ordered for the different observatories.

Mr. Scott submitted the following form of answer proposed to be given by the Committee in reply to memorials regarding storm signals forwarded by the Board of Trade, which was approved of:—

Meteorological Office, Parliament Street, London, S.W.,

SIR, 186 .

I AM directed by the Meteorological Committee to acknowledge the receipt of and to inform you that this office is prepared to forward each day by post, to any port which may require it, a copy of the Daily Weather Report, the same as that furnished to the second edition of the London morning papers. This copy will be forwarded free of expense.

Should the at require regular or occasional telegraphic intelligence, you are requested to inform them that, on receipt of an application stating the precise

nature and amount of information required, this office is prepared to furnish, without unnecessary delay, any telegraphic information which it may have received.

In the case of telegraphic communications of this nature, half of the expense of the transmission is to be borne by the local authorities.

I have the honour to be, Sir, your obedient Servant,

Secretary to the Committee.

The Secretary read to the Committee applications for the situation of Chief Clerk, accompanied with testimonials, from Mr. William Salmon, naval instructor, and from Mr. Richard Strachan,

The Committee having considered the claims of the two candidates,

Resolved,—That Mr. Salmon be requested to come to London and communicate with Mr. Scott.

The Committee then adjourned until Monday, the 18th instant, at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 18*th March* 1867.

PRESENT:

General Sabine in the Chair.

The Hydrographer.	Colonel Smythe.
Dr. W. A. Miller.	Mr. De La Rue.
Mr. Spottiswoode.	

The Director and Secretary to the Committee were in attendance.

The minutes of last meeting were read and confirmed.

The consideration of Captain Toynbee's report was postponed.

Mr. Scott presented the following report of his and Captain Toynbee's visit to Yarmouth:—

REPORT to the METEOROLOGICAL COMMITTEE of an Inspection of the Meteorological Station at Yarmouth.

We have to report that, in pursuance of the Resolution of the Committee of the 11th instant, we visited the Meteorological Station at Yarmouth, on the 15th and 16th instant. Having informed the clerk in charge, Mr. Robinson, of our intention to inspect the station, that gentleman met us at the Railway Terminus, and conducted us at once to the Telegraph Office on the Quay, where the instruments are placed.

The whole of the instruments appear to be in good order and well cared for, and the record is carefully kept. The barometers are placed in the office and in a good light. One of those first sent down having been broken, it was returned, and the spare one set up in its place. The two instruments read exactly alike.

The maximum and minimum thermometers are very badly placed, being hung against a wooden partition in the entrance hall of the office. The partition is not firm, and the thermometers do not give the temperature of the external air at all, as they are not exposed to it. They are never used, and if it be required to observe them a new situation must be found for them. The wet and dry bulb thermometers are suspended in a wooden case against the wall of a washhouse, and opposite to the kitchen windows and main wall of the house, distant about 6 feet. The yard is very small and confined, and no free current of air can reach it.

The rain gauge is in the back yard of Mr. Robinson's own house. The houses close to it are only one storey high, so that it is fairly exposed to the wind from all quarters.

The direction of the wind is obtained from the vane on the signal staff opposite the Custom House. The bearings of the cardinal points of this are magnetically correct as tested by us.

As the Telegraph Station above referred to is at some distance from the beach, an additional allowance of 5*s.* per week is made to Mr. Robinson for obtaining information daily, as to the sea disturbance. This was granted by the Department on the 4th April 1866.

After inspecting the instruments we repaired to the second Telegraph Station, on the beach, close to the Sailors' Home. This is a much smaller office, but it adjoins the Fish Wharf, in the yard attached to which a place might be found for the thermometers. The wall of the building runs E. and W. true, and there is a low wall 6 feet high opposite, distant about 20 feet, and beyond that a road. If the thermometers were sheltered from the evening sun, we might suggest that they might be set up here in a wooden case, and space might perhaps be found for the barometers in the office. The direction of the wind might be obtained from the vane on the signal staff in front of the Sailors' Home, which is correctly placed magnetically, the bearings being marked on a sundial at the foot of the staff.

Such an arrangement would obviate the necessity of paying a special messenger to report the state of sea disturbance every day, as the office itself is actually on the sea beach.

If this suggestion be approved negociations might be at once opened with the Telegraph Company, in order to have the locality of the instruments changed if possible.

After completing the inspection we called on Captain Smyth, the Harbour Master, at Gorleston, at the Harbour's mouth. This gentleman sends up monthly records of observations made under his superintendence with the Fishery Barometer. He states that the force of the wind is always given by the beachmen, who assign too high a number in general.

(Signed) ROBERT H. SCOTT.
HENRY TOYNBEE.

Resolved,—That this report be received and printed in the minutes, and that Mr. Scott proceed to carry out his suggestions so as to improve the observations at Yarmouth as much as possible. The Committee also recommend that Mr. Scott might consider how the Weather Report for the various stations might be improved.

Mr. Stewart presented the following report regarding the progress of the self-recording instruments :—

To the Meteorological Committee.

REPORT ON THE STATE OF PROGRESS OF SELF-RECORDING INSTRUMENTS FOR THE OBSERVATORIES OF THE BOARD OF TRADE.

On January 25th, the Secretary was authorized by the Chairman of the Meteorological Committee to order five sets of self-recording instruments.

The plans were forthwith put into the hands of opticians, and the following is the present state of progress of these instruments :—

Thermographs.

These instruments, with the exception of the lenses, are being constructed by P. Adie, 395, Strand.

The clocks are in a forward state.

All the patterns are made and the greater part cast.

The cylinders are prepared and the ends and centres are being fitted.

The lenses for all the instruments are being made by Dallmeyer. Three complete sets are already made, and the others partly so.

Mr. Dallmeyer thinks it desirable that one workman should finish all the lenses.

Barographs.

These instruments, with the exception of the lenses, are being made by Adie.

The clocks are in a forward state, and all the patterns are made.

The lenses, however, are not yet made.

The cylinders are prepared, and the ends and centres are being fitted.

Anemometers.

These instruments are being made partly by Casella and partly by Smith and Beck. They will all be ready in two months time from this date.

Additional Building at Kew.

The plan of this building has been made by Mr. Wright, architect, of King Street, City, and its site has been determined and staked out.

On Friday next two builders will have given in tenders for the work, and as soon as the Kew committee have resolved which to accept the work may be commenced.

If a commencement is made on the 1st of next month punctually, everything will, it is imagined, be quite ready for receiving and verifying the self-recording instruments by the end of June.

By that time it may be presumed that the various opticians will be prepared to deliver their instruments as fast as these can be verified by the staff at Kew.

It might be arranged that the process of verification as well as the photographic process of obtaining curves should be witnessed and participated in, for each set of instruments, by the observer who will ultimately take charge of the instruments, who would by this means receive practical instruction regarding his instruments, and the method of using them.

When the process of verification of any one set is at an end, the instruments might be packed up and taken charge of by the observer, who might convey them to his observatory, and when everything is ready for mounting them, Mr. Beckley, the mechanical assistant at Kew, might assist in erecting the instruments in their respective places.

Mr. Scott reported that Mr. Salmon had waited on him, and he read to the Committee several private testimonials in favour of that gentleman.

Resolved,—That Mr. William Salmon be appointed first clerk, to commence from the 1st of April, and that the Secretary inform him of his appointment.

General Sabine read a letter from Mr. Meldrum regarding the collection of Meteorological Observations in the Indian Ocean, made by the Meteorological Society of Mauritius.

Read memorials urging the resumption of storm signals from the underwriters and shipowners of Glasgow and Greenock, and from the Leith Chamber of Commerce, which had been forwarded to the Meteorological Committee by the Board of Trade.

Resolved,—That the Secretary reply to these bodies in the terms agreed on by the Committee for all such memorials.

The Committee then adjourned until Monday the 25th inst., at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, 25th March* 1867.

PRESENT :

General Sabine in the Chair.

Capt. Richards.	Col. Smythe.
Mr. Gassiot.	Mr. Spottiswoode.
Mr. De La Rue.	

The Director and Secretary to the Committee were in attendance.

The minutes of last meeting were read and confirmed.

A few remarks were made regarding the foreign correspondence (see minutes of meeting of 11th inst).

The Committee then entered into the consideration of Captain Toynbee's report.

Resolved,—That the Committee will reconsider the Weather Book Instructions to commanders previously to reprinting, and that Captain Toynbee's suggestions be taken into consideration before the reprint be made.

The Hydrographer presented the following circular letter to masters (founded on Captain Toynbee's report), which was adopted by the Committee, 500 copies to be printed.

CIRCULAR MEMORANDUM.

The Meteorological Department lately under the direction of Admiral FitzRoy has been placed by the Board of Trade under the management of a Committee appointed by the Royal Society. This Committee being desirous of resuming the collection of ocean statistics, which for some time past has in a great measure fallen into disuse, your co-operation and assistance are invited in aid of this important work, the object of which is to advance the knowledge of physical geography generally, making public such information as may be collected in the form of charts, showing the prevailing winds and currents of the ocean at the different seasons of the year. To such captains as are willing to give their co-operation in this work, the Committee are prepared to supply the requisite standard instruments, together with duplicate registers, the one a rough book for recording the observations (which may be retained by the commander as a reference for future voyages), the other to be returned to the Meteorological Department at the termination of the voyage.

The observations principally desired are the height of the barometer, the readings of the thermometer (wet and dry bulb), the specific gravity of the sea, and especially the surface temperature, together with the force and direction of the wind, the state of the weather, and other atmospheric phenomena, with such remarks as cannot fail to occur to the mind of the intelligent seaman.

The books to be supplied will contain all the necessary directions for making these observations, as well as the exact nature of the information desired ; and while the observers may rest assured that their contributions will be turned to good and early account for the practical benefit of seamen, it is necessary to remind them that unless they are made with that care and fidelity which can alone render them valuable (and which is apparent at once on the examination and discussion of such observations), both their labours and those of the Department will have been in vain.

The Director of the new Meteorological Office is Mr. Robert H. Scott, M.A. ; and the Marine Superintendent is Captain Henry Toynbee, of the Mercantile Marine.

With this latter gentleman those officers who are willing to become contributors are invited to correspond freely on all subjects connected with the work, and Captain Toynbee will be prepared to give interviews, and personal instruction regarding the use of the instruments to those who may desire it, between the hours of 11 a.m. and 4 p.m., at the Meteorological Office, No. 2, Parliament Street, Westminster.

_____

Secretary to the Committee.

To _____

Commander of the Ship _____

Mr. Scott reported that he had had a satisfactory interview with the Leith deputation, and that these gentlemen will make an effort to avail themselves of the proposals of this Committee as to weather reports.

Mr. Scott presented a list, made by Captain Toynbee, of the serviceable instruments in the office.

Resolved,—That Mr. Scott make out a list of such instruments as he thinks are required, to be considered at next meeting.

Mr. Scott mentioned that he had had some correspondence regarding the office seal, and had finally ordered a plain stamp.

With regard to the application from Brightlingsea for a barometer, Mr. Scott stated that this town has 1,500 inhabitants and a fleet of 200 boats. The nearest barometer is at Harwich, distant about 15 miles.

Resolved,—That a barometer be granted to this place.

Mr. Scott stated that he had been informed by the Stationery Office that their copies of the Coast or Fishery Barometer Manual are exhausted.

Resolved,—That Mr. Scott be requested to examine this work in preparation for another edition.

Mr. Scott also reported his correspondence with Mr. Matteucci.

Mr. Stewart read a letter which he had received from Falmouth, requesting his presence to inspect the site for the proposed observatory.

Resolved,—That Mr. Stewart make arrangements for the purpose, and visit the stations at Plymouth and Penzance at the same time.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 1*st April* 1867.

PRESENT :

General Sabine in the Chair.

Capt. Richards.	Mr. Spottiswoode.
Mr. De La Rue.	Col. Smythe.
Mr. Gassiot.	Dr. W. A. Miller.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Mr. Scott presented the following report regarding unserviceable instruments in the Office :

MEMORANDUM RESPECTING UNSERVICEABLE INSTRUMENTS.

2 experimental barometers mounted on the same mahogany slab. This has never been of any use, and is therefore only lumber.

1 Pediment baromer, in wood, by Thomas Jones, old and damaged.

1 mountain barometer, in wood, by Newman, broken and material very old.

6 marine barometers, in wood, Newman, ⌃ No. 12, broken.

Newman (no number), defective.

Dennis, ⌃ No. 20, defective.

Bate, ⌃ 72, broken.

John Jones, ⌃ defective.

John Jones, ⌃ worthless.

1 marine barometer, brass frame in part only, would cost nearly the price of a new one to repair. The brass is much corroded. Is marked "Casella A 20."

1 large ivory thermometer scale, Adie No. 6, in mahogany box.

1 deep-sea thermometer case (old copper).

4 Johnson's metallic deep-sea thermometers, No. 1, 7, 9, 10, all requiring expensive repairs, and these instruments are found to be next to useless.

18 ring weights (formerly used as messengers with deep-sea thermometers, now not required), they consist of brass and lead.

33 brass thermometer scales.

7 brass hydrometers (broken).

13 zinc thermometer scales.

8 zinc rain gauges (old).

1 maximum thermometer, 3385
4 thermometer cases (tin) } useless.

In order to complete sets of instruments for issue to merchant ships, it would be desirable to order 36 sets of thermometers, and 20 thermometer screens.

(Signed) H. TOYNBEE.
(Approved) R. H. SCOTT.

Resolved,—That Mr. Scott's report be approved of, and that the useless instruments be sold for old materials.

Mr. Gassiot reported that the Kew Committee of the British Association had on 28th ult. examined and approved of the proposed plans and specifications for the additional building required to complete the Observatory as a Central Meteorological Station.

The lowest tender was that of Messrs. Clerihew and Lascelles for 880*l*. In addition to that amount there will be the architect's commission, the cost of a dome, gas, and other fittings; the total outlay will not exceed the amount of the original estimates.

The Kew Committee suggest that anemometers denoting velocity and direction of the wind might be used at the ordinary stations. The cost of these would be 15*l*. each, but should the Meteorological Committee consider that an anemometer which would merely record the velocity is sufficient, it could be made in a proper manner for 10*l*.

The Kew Committee have adopted the suggestion of Mr. Stewart as to verifying and mounting the instruments and instructing observers, as explained by him to the Meteorological Committee on the 18th ult.

Resolved,—That the opinion of this Committee is in favour of the anemometer indicating both direction and force.

Mr. Scott stated that Mr. Salmon, the newly-appointed chief clerk, had reported himself.

Mr. Scott, having asked for information regarding the work to be done in the Office, now that the staff was complete,

Resolved,—That Mr. Scott communicate with the Hydrographer regarding the best manner of extracting the information contained in logs.

Resolved,—That Mr. Scott be requested to consider the Weather Book Instructions with reference to any alterations or additions that it may be desirable to introduce previous to reprinting.

Mr. Scott brought before the Committee an application from Cullen for a fishery barometer.

Resolved,—That the Secretary state, in reply to the application, that the Committee, having referred to the previous correspondence, regret that they cannot comply with the request.

Mr. Scott reported that the quarter's salaries of the officers which were due on Saturday had not been paid.

Resolved,—That the Secretary of this Committee write to the Secretary of the Board of Trade, asking for information as to how these salaries may be drawn.

The Committee then adjourned until Monday, 8th inst., at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, 8th April* 1867.

PRESENT:

General Sabine in the Chair.

Mr. Gassiot. | Col. Smythe.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Mr. Scott having stated that he had communicated with the Hydrographer regarding best method of extracting the information contained in logs;

Resolved—That Mr. Scott give a preliminary trial to the various methods, and for this purpose, that he be authorized to order 500 cards of the pattern suggested in the Parliamentary report (page 10).

Mr. Scott presented three medals which he had received from M. Leverrier, and was directed to request instructions regarding them from the Board of Trade.

Mr. Scott submitted a report as to the work already done in the Office regarding ocean temperature for the South Atlantic.

He also recommended that, in accordance with a suggestion of General Sabine, the results of sea temperatures, contained in the publications of the Dutch Meteorological Institutions be reduced to Fahrenheit's scale, and that, as a translation of the text of this work was in preparation, a MS. copy be kept in this Office.

Resolved—That the Committee approve of Mr. Scott's recommendation.

The Secretary presented to the Committee the following report of his visit to Falmouth, Penzance, and Plymouth:—

REPORT to the METEOROLOGICAL COMMITTEE of a VISIT of the SECRETARY to FALMOUTH, PENZANCE, and PLYMOUTH.

On Wednesday, April 3, the Secretary, accompanied Mr. Alfred Lloyd Fox, and other Members of Committee of the Polytechnic Institution of Falmouth, in order to visit certain sites proposed as suitable for the Meteorological Observatory there.

Pendennis Castle was first visited. It appeared, however, to be doubtful whether this building, or any part of it, would ever be so entirely given up to civilians as to suit the views of the Committee. It would also be at a distance from the home of the observer, and it would not be lit by gas.

A site was then inspected not far from the railway terminus, but this lay too low and was too much shut in for meteorological purposes.

The bowling green was next surveyed. This ground forms an elevated plateau, being higher than the surrounding ground for some distance on all sides. Part of this ground is already built upon, and more buildings may afterwards arise.

The Polytechnic Committee proposed to meet this objection by raising a tower at least 30 feet above the summit of the neighbouring houses. It is imagined that in this case there would be no meteorological objection to this site, as the bowling green is well exposed to the wind from all quarters. It was also understood that Mr. Robert Were Fox, who is at present on the continent, has given his opinion that the bowling green is both a good and a convenient site. In the event of some building on this site being selected, a permanency of tenure could be secured, and gas could be easily laid on, while Greenwich time could very readily be obtained.

On Thursday the Secretary inspected the meteorological station at Penzance.

The observations there are made by Mr. Gill, the clerk in charge at the telegraph station.

He has two barometers, No. 165 and No. 336, but all the readings are from the former of these.

Mr. Gill knows how to read the instrument correctly.

After having read the instrument every morning at 8, he takes a number of readings throughout the day, perhaps at the rate of one every two hours, and the highest and lowest of these are sent to London as recording the highest and lowest atmospheric pressure. In cases of stormy weather the instrument is sometimes watched till past midnight.

The wet and dry bulb thermometers are exposed on a post connected with the railway station. No

sun can reach them, and there is probably a considerable current of air. The instruments however, have their copper cases attached to them, and these prevent a free exposure of the bulbs to the air; at the same time, if they had not these cases, they might be liable to accident. The arrangement for moistening the wet bulb was not perfect.

The minimum thermometer has been accidentally broken, and the maximum is in consequence not read.

There is a vane attached to a pole at the end of the goods' shed, which is correctly placed, but Mr. Gill prefers observing the direction of motion of the lower clouds, and giving that as the direction of the wind. Perhaps this is advisable as the station lies very low and has much higher ground behind it.

Mr. Gill judges of the force of the wind by going down to the pier, and of the state of the sea in the same manner.

The rain gauge is placed in an open space near the battery, which appears to be a good locality.

On Friday the Secretary inspected the Meteorological Station at Plymouth.

P. The observations there are made by Mr. Finchin, the clerk in charge of the telegraph station.

He has two barometers, No. 139 and No. 375, but all his readings are from the former of these.

He understands how to read the instrument, and his mode of procedure in determining the maximum and minimum pressure is precisely the same as that adopted at Penzance.

The wet and dry bulb thermometers are not attached to their copper cases. These instruments hang generally outside a window, the bulb being kept from touching the stone. The arrangement for moistening the wet bulb was not perfect.

About 7 every morning the instruments are taken to an exposed place at the railway station, which is, however, sheltered from the sun, and they are read an hour afterwards. This arrangement appears to be very good.

The dry bulb thermometer, in its ordinary place, outside the window, is read every two hours from morning till night, and the highest and lowest readings are recorded as the maximum and minimum

P/ temperature. Mr. Finchin has a maximum and minimum thermometer, but he did not know how to use them until their use was explained by the Secretary.

P/ The direction of the wind is judged of by observations of the clouds made by Mr. Finchin.

He goes every morning to the Hoe, and there judges of the wind's force, while with an opera glass he views the sea disturbance beyond the Breakwater.

One of his assistants, who lives out of town, and has an open space, observes the rain gauge for him.

P. As far as the Secretary can judge, both Mr. Gill at Penzance and Mr. Finchin at Plymouth take the observations conscientiously, and their offices are resorted to by sea-faring men and others interested in meteorology. The system of observations, as far as can be judged from these two stations, would thus seem to be well adapted to give readily a rough idea of any considerable atmospheric disturbance occurring at either station; but it seems doubtful if this system could ever be extended so as to give results of any scientific value. The Secretary would not recommend that an anemometer should be erected at either station; indeed, the stations themselves are selected with the view of obtaining quickly the news of any considerable disturbance, not with the view of representing fairly the climate of the place.

If this view be taken by the Committee, it might ultimately be desirable to diminish the number of observations required from each station.

The Committee then adjourned until Monday, the 15th inst., at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 15*th April* 1867.

PRESENT:

General Sabine in the Chair.

Dr. W. A. Miller.	Mr. Gassiot.
Mr. Spottiswoode.	Col. Smythe.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Mr. Scott stated that the Board of Trade had undertaken to distribute the three medals which he had received from M. Leverrier.

At the suggestion of General Sabine the Committee resolved that it is desirable to select as soon as convenient a suitable person to take charge of the Meteorological Establishment at Valentia; and that Mr. Scott be requested to direct his attention to this matter.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

13, *Ashley Place*, 22*nd April* 1867.

SPECIAL MEETING.

PRESENT:

General Sabine in the Chair.

Dr. W. A. Miller.	Mr. Gassiot.
The Hydrographer.	Col. Smythe.

The Director and Secretary to the Committee were in attendance.

Mr. Scott stated that he had convened this special meeting in order to take into consideration the following letters received from the Board of Trade since the last meeting of the Committee:

M. 3040.

SIR,

Board of Trade, Whitehall, 15th April 1867.

I AM directed by the Board of Trade to transmit to you the accompanying copy of a letter from the Treasury respecting the establishment that will be required to carry out the Meteorological operations undertaken by the Royal Society, and the proposed estimates for the expenses of the Meteorological Office.

I am, Sir,
Your obedient servant,
(Signed) THOMAS GRAY.

R. H. Scott, Esq.,
Meteorological Office, Parliament Street.

M. 3040.

SIR,

Treasury Chambers, 10th April 1867.

WITH reference to your letter of the 8th of February last, transmitting copies of two letters from the Meteorological Committee of the Royal Society, giving a detailed estimate of the sum which will be required by them during the year 1867–8 for the conduct of the business lately transferred to them from the Meteorological Department of the Board of Trade, I am directed by the Lords Commissioners of Her Majesty's Treasury to acquaint you, for the information of the Lords of the Committee of Privy Council for Trade, that my Lords must decline to express any opinion upon the establishment that will be required to carry out the Meteorological operations undertaken by the Royal Society, as the officers to be employed by that society will not be in any sense in the Civil Service of the Crown.

I am desired to state that, in assenting to insert in the estimates a lump sum of 10,000*l.*, my Lords understood that the whole of the arrangements will be undertaken by the Royal Society on their own responsibility, and that no claims will be made upon the Public Purse over and above what that sum will cover, and that any saving out of that sum will be surrendered to the Exchequer as in the case of other votes.

I am, &c.
(Signed) G. A. HAMILTON.

T. H. Farrer, Esq.

M. 3230.

SIR,

Board of Trade, Whitehall, 17th April 1867.

I AM directed by the Board of Trade to transmit to you, for the information of the Royal Society, the accompanying copy of a letter from the Treasury relating to the payment of the salaries of the gentlemen solicited by the Meteorological Committee to perform the duties of the Meteorological Department.

I am, Sir,
Your obedient servant,
(Signed) THOMAS GRAY.

R. H. Scott, Esq.,
Meteorological Office, 2, Parliament Street.

M. 3230.
4370 $\frac{17}{4}$.

SIR,

Treasury Chambers, 17th April 1867.

WITH reference to Mr. Gray's letter of the 12th ultimo, relating to the payment of the salaries of the gentlemen selected by the Meteorological Committee of the Royal Society to carry out the various duties of the Meteorological Department for the quarter ending the 31st ultimo, I am directed

by the Lords Commissioners of Her Majesty's Treasury to acquaint you, for the information of the Lords of the Committee of Privy Council for Trade, that as these several officers were appointed by the Committee of the Royal Society and are not in any sense servants of the Crown, my Lords are of opinion that any salary that may be due to them must be defrayed out of the 10,000*l.* which has been inserted in the estimates of the present year as a contribution towards the expenses of the meteorological researches undertaken by the Royal Society, and not out of the grant for scientific works and experiments 1866–7.

My Lords request that an intimation to this effect may be addressed to the Royal Society, who should at the same time be informed that my Lords will be prepared on application from time to time to make advances on account of the said sum of 10,000*l.* which is intended to be appropriated for this service.

I am, &c.

T. H. Farrer, Esq. (Signed) GEORGE WARD HUNT.

Resolved—That Mr. Scott send the following reply:

Meteorological Office, 2 Parliament Street,

SIR, 23rd April 1867.

I HAVE the honour to acknowledge the receipt of a letter from you dated April 15th 1867, enclosing a copy of one from the Treasury, dated April 10th, in reply to one from the Board of Trade, of February 8th.

Also of a second letter dated April 17th, enclosing a copy of one from the Treasury of same date, in reply to one from the Board of Trade of March 12th.

I have laid both these letters before the Meteorological Committee.

I am directed by the Committee, in the first instance, to draw your attention to the phrase used in your letter of the 15th April, viz., "Meteorological operations undertaken by the Royal Society," whereas Mr. Farrer's letter of February 8th, addressed to the Secretary of the Treasury (being the letter of that date above referred to) describes the Committee as "a Scientific Committee appointed by "the President and Council of the Royal Society to conduct the meteorological business of the Board of "Trade." This distinction is the more important, inasmuch as in the letter from the Treasury of April 17th above referred to, it is stated that a sum "has been inserted in the estimates of the present "year as a contribution towards the expenses of the meteorological researches undertaken by the Royal "Society."

The Royal Society, in accordance with the request of the Board of Trade, contained in Mr. Farrer's letter of December 5th, addressed to the President of the Royal Society, nominated a Committee for the conduct of the Meteorological Department of the Board of Trade, but the Royal Society themselves, as a body, neither collect nor conduct meteorological observations and contribute nothing to this object.

I am further desired to point out that whereas in the letter from the Treasury of April 10th, above referred to, it is stated that the lump sum of 10,000*l.* which is inserted in the estimates of the present year is to defray all expenses, in the letter of the Board of Trade to the Treasury, of February 8th, the estimate furnished by this Committee is quoted as 12,800*l.*, viz., 9,900*l.* for "ordinary expenditure" and 2,900*l.* for "first outlay." These estimates were approved by the Board of Trade, and recommended to the Treasury for adoption. This sum of 12,800*l.* is less than what was contemplated by the joint committee appointed to consider certain questions relating to the Meteorological Department of the Board of Trade (Report, p. 40) as explained by Mr. Farrer in the body of the letter.

As soon as this Committee ascertained that the estimates of 9,900*l.* for ordinary expenditure and 2,900*l.* for first outlay had been approved by the Board of Trade, and forwarded to the Treasury, who (*vide* Mr. Farrer's letter of December 5th, 1866, above referred to,) had authorized the preparation of estimates, the Committee proceeded to order the instruments required for the different observatories, and obtained plans and estimates for the additional buildings at Kew Observatory. The immediate erection of the building at Kew, and outfit of the outlying observatories, is indispensable for the commencement of the operations of the Committee.

The instruments are now nearly ready, but the works at Kew have not been commenced. The cost of these instruments and buildings will be 2,900*l.*, but this outlay would only be requisite in the present year, and consequently forms no part of the current annual expenditure, which, the Committee believe, will not exceed the original estimate of 9,900*l.*

With reference to the letter from the Treasury, of date April 17th, which refers to the payment of the salaries of the several (three) officers appointed by the Committee, I am desired to state that the wages of the clerks up to the 31st of March have been paid by the Board of Trade, the vouchers or salary lists being signed in regular course by me as Director of the Meteorological Office.

When the Committee undertook the superintendence of this Office it was distinctly understood that the salaries of the officers and wages of the clerks would be paid by the Board of Trade up to the end of the Financial Quarter, and subsequently out of the annual grant.

In conclusion, I beg leave to inform you that, if after this explanation it should be still the desire of the Board of Trade that I should do so, I shall cause a copy of your letter of the 17th April to be forwarded to the President and Council of the Royal Society.

I have the honor to be, Sir,

Your obedient servant,

(Signed) ROBERT H. SCOTT,

Director.

Thomas Gray, Esq., Board of Trade.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 29*th April* 1867.

PRESENT:

General Sabine in the Chair.

The Hydrographer.	Mr. Spottiswoode.
Dr. W. A. Miller.	Mr. Gassiot.

The Director and Secretary to the Committee were in attendance. The minutes of the last two meetings were read and confirmed.

Mr. Scott reported that he understood from a letter of Mr. Gray, that the Treasury had resolved to modify their letter of 10th April as follows:

M. 3040.

SIR, Treasury Chambers, 10th April 1867.

WITH reference to your letter of the 8th of February last, transmitting copies of two letters from the Meteorological Committee of the Royal Society, giving a detailed estimate of the sum which will be required by them during the year 1867–8 for the conduct of the business lately transferred to them from the Meteorological Department of the Board of Trade, I am directed by the Lords Commissioners of Her Majesty's Treasury to acquaint you, for the information of the Lords of the Committee of Privy Council for Trade, that my Lords must decline to express any opinion upon the establishment that will be required to carry out the Meteorological operations undertaken by the Committee appointed at the request of the Government by the Royal Society, as the officers to be employed by that Committee will not be in any sense in the Civil Service of the Crown.

I am desired to state that, in assenting to insert in the estimates a lump sum of 10,000*l.*, my Lords understood that the whole of the arrangements would be undertaken by the Committee on their own responsibility, and that no claims will be made upon the Public Purse over and above what that sum will cover, and that any saving out of that sum will be surrendered to the Exchequer as in the case of other votes.

I am, &c.

T. H. Farrer, Esq. (Signed) G. A. HAMILTON.

Mr. Scott also reported, that having made a personal application to the Treasury through the accountant's office of the Board of Trade, as to the mode of obtaining money on account, he had been informed that an application from the Chairman of the Committee to the Treasury, requesting that an imprest for 2,000*l.* be granted to the Director, would be the proper form.

Resolved—That the following altered draft of a letter from Mr. Scott to Mr. Gray be adopted, and that the Chairman be requested to write a note to accompany this letter:—

Meteorological Office, 2, Parliament Street,

SIR, 23rd April 1867.

I HAVE the honour to acknowledge the receipt of a letter from you dated April 15th, 1867, enclosing a copy of one from the Treasury, dated April 10th, in reply to one from the Board of Trade, of February 8th.

Also of a second letter dated April 17th, enclosing a copy of one from the Treasury of same date, in reply to one from the Board of Trade of March 12th.

I have laid both these letters before the Meteorological Committee.

I am directed by the Committee, in the first instance, to draw your attention to the phrase used in the letter from the Treasury of April 17th above referred to, in which it is stated that a sum "has "been inserted in the estimates of the present year as a contribution towards the expenses of the "meteorological researches undertaken by the Royal Society."

The Royal Society, as a body, neither collect nor conduct meteorological observations and contribute nothing to this object.

I am further desired to point out that whereas in the letter from the Treasury of April 10th, above referred to, it is stated that the lump sum of 10,000*l.* which is inserted in the estimates of the present year is to defray all expenses, in the letter of the Board of Trade to the Treasury, of February 8th, the estimate furnished by this Committee is quoted as 12,800*l.*, viz., 9,900*l.* for "ordinary expenditure," and

2,900*l.* for "first outlay." These estimates were approved by the Board of Trade, and recommended to the Treasury for adoption. This sum of 12,800*l.* is less than what was contemplated by the joint committee appointed to consider certain questions relating to the Meteorological Department of the Board of Trade (Report, p. 40) as explained by Mr. Farrer in the body of the letter.

As soon as this Committee ascertained that the estimates of 9,900*l.* for ordinary expenditure and 2,900*l.* for first outlay had been approved by the Board of Trade, and forwarded to the Treasury, who (*vide* Mr. Farrer's letter of December 5th, 1866, above referred to,) had authorized the preparation of estimates, the Committee proceeded to order the instruments required for the different observatories, and obtained plans and estimates for the additional buildings at Kew Observatory. The immediate erection of the building at Kew, and outfit of the outlying observatories, is indispensable for the commencement of the operations of the Committee.

The instruments are now nearly ready, but the works at Kew have not been commenced. The cost of these instruments and buildings will be 2,900*l.*, but the outlay would only be requisite in the present year, and consequently forms no part of the current annual expenditure which, the Committee believe, will not exceed the original estimate of 9,900*l.*

With reference to the letter from the Treasury, of date April 17th, which refers to the payment of the salaries of the several (three) officers appointed by the Committee, I am desired to state that the wages of the clerks up to the 31st of March have been paid by the Board of Trade, the vouchers or salary lists being signed in regular course by me as Director of the Meteorological Office.

When the Committee undertook the superintendence of this Office it was distinctly understood that the salaries of the officers and wages of the clerks would be paid by the Board of Trade up to the end of the Financial Quarter, and subsequently out of the annual grant. The Committee having acted upon this understanding hope the arrangement will be carried out.

In conclusion, I beg leave to inform you that, if after this explanation it should be still the desire of the Board of Trade that I should do so, I shall cause a copy of your letter of the 17th April to be forwarded to the President and Council of the Royal Society.

I have the honour to be, Sir,
Your obedient servant,
(Signed) Robert H. Scott,
Director.

Thomas Gray, Esq., Board of Trade.

P.S.—Having been informed that the accountant of the Treasury is now authorized to pay 2,000*l.* on account under the signature of the chairman of this Committee, an application has been made by me for that sum, as the money is required for defraying expenses already incurred.

Resolved—That when this money is obtained an account be opened at the Branch Bank of England, Burlington Gardens; cheques to have the signature of one member of the Committee, countersigned by Mr. Scott.

Mr. Scott reported that his attempts to amend the observations at Yarmouth, in accordance with the Committee's resolution of March 18th, have been without success.

Mr. Scott submitted a letter which he had received from the Trinity House, Hull, requesting that a copy of the weather report be sent daily, and stated that he had at once complied with the request

Mr. Scott reported that Captain G. Blane, Director of the Steam Company for the line between Panama and New Zealand, had been at the Office this morning, and had expressed his personal willingness to assist the work of the Committee in any way that he could. Captain Blane will bring the question before the Board next Friday, and will lend the Committee every assistance in communicating with the officers in the service.

Mr. Scott submitted an application from Professor Main for permission to repair barometers at Portsmouth.

Application not complied with.

Mr. Scott suggested that as regards the future work of the Office, in order to have the most important parts of the ocean examined first, a definite portion should be marked out with the view of obtaining the information relating to that district as soon as convenient. Approved.

Mr. Scott reported that Captain Toynbee had requested him to ask the Committee to authorize the printing of certain suggestions to be inserted in the present Weather Book Instructions, as at present much correspondence is rendered necessary which might thus be obviated. He would, therefore, submit that these suggestions be printed.

Resolved—That Mr. Scott's suggestion be complied with.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, May 6th*, 1867.

PRESENT:

General Sabine in the Chair.

Mr. Spottiswoode. | Mr. Gassiot.
Colonel Smythe. |

The Director and Secretary to the Committee were in attendance. The minutes of the last meeting were read and confirmed.

Mr. Scott reported that letters to himself from the Board of Trade, dated 15th and 17th April, and a letter from the Treasury to the Board of Trade, dated 17th April (see minutes 22nd April), had been amended, and now read as follows:—

M. 3040.

SIR, Board of Trade, Whitehall, 15th April 1867.

I AM directed by the Board of Trade to transmit to you the accompanying copy of a letter from the Treasury respecting the establishment that will be required to carry out the Meteorological operations undertaken by the Committee appointed at the request of the Government by the Royal Society, and the proposed estimates for the expenses of the Meteorological Office.

I am, Sir,
Your obedient servant,
(Signed) THOMAS GRAY.

R. H. Scott, Esq.,
Meteorological Office, Parliament Street.

M. 3230.

SIR, Board of Trade, Whitehall, 17th April 1867.

I AM directed by the Board of Trade to transmit to you, for the information of the Meteorological Committee, the accompanying copy of a letter from the Treasury relating to the payment of the salaries of the gentlemen s[illegible]ted by the Meteorological Committee to perform the duties of the Meteorological Department.

I am, Sir,
Your obedient servant,
(Signed) THOMAS GRAY.

R. H. Scott, Esq.,
Meteorological Office, 2, Parliament Street.

M. 3230.
$4370\frac{17}{4}$.

SIR, Treasury Chambers, 17th April 1867.

WITH reference to Mr. Gray's letter of the 12th ultimo, relating to the payment of the salaries of the gentlemen selected by the Meteorological Committee of the Royal Society to carry out the various duties of the Meteorological Department for the quarter ending the 31st ultimo, I am directed by the Lords Commissioners of Her Majesty's Treasury to acquaint you, for the information of the Lords of the Committee of Privy Council for Trade, that as these several officers were appointed by the Committee of the Royal Society and are not in any sense servants of the Crown, my Lords are of opinion that any salary that may be due to them must be defrayed out of the sum of 10,000*l.* which has been inserted in the estimates of the present year as a contribution towards the expenses of the meteorological researches undertaken by the Committee appointed at the request of the Government by the Royal Society, and not out of the grant for scientific works and experiments 1866–7.

My Lords request that an intimation to this effect may be addressed to the Secretary of the Meteorological Committee, who should at the same time be informed that my Lords will be prepared on application from time to time to make advances on account of the said sum of 10,000*l.* which is intended to be appropriated for this service.

I am, &c.
(Signed) GEORGE WARD HUNT.

T. H. Farrer, Esq.

Resolved—That in consequence of these modifications the letter of Mr. Scott to the Board of Trade be as follows:—

Meteorological Office, 2, Parliament Street,
23rd April 1867.

SIR,

I HAVE the honour to acknowledge the receipt of a letter from you dated April 15th, 1867, enclosing a copy of one from the Treasury, dated April 10th, in reply to one from the Board of Trade of February 8th.

Also of a second letter dated April 17th, enclosing a copy of one from the Treasury of same date, in reply to one from the Board of Trade of March 12th.

I have laid both these letters before the Meteorological Committee.

I am directed by the Committee, in the first instance, to draw your attention to the phrase used in the letter from the Treasury, April 17th, above referred to, in which it is stated that a sum "has been "inserted in the estimates of the present year as a contribution towards the expenses of the "meteorological researches undertaken by the Committee appointed at the request of the Government "by the Royal Society."

The Meteorological Committee itself cannot be expected to contribute any funds towards this object.

I am further desired to point out that whereas in the letter from the Treasury of April 10th, above referred to, it is stated that the lump sum of 10,000*l.* which is inserted in the estimates of the present year is to defray all expenses, in the letter of the Board of Trade to the Treasury, of February 8th, the estimate furnished by this Committee is quoted as 12,800*l.*, viz., 9,900*l.* for "ordinary expenditure," and 2,900*l.* for "first outlay." These estimates were approved by the Board of Trade, and recommended to the Treasury for adoption. This sum of 12,800*l.* is less than what was contemplated by the joint committee appointed to consider certain questions relating to the Meteorological Department of the Board of Trade (Report, p. 40) as explained by Mr. Farrer in the body of the letter.

As soon as this Committee ascertained that the estimates of 9,900*l.* for ordinary expenditure and 2,900*l.* for first outlay had been approved by the Board of Trade, and forwarded to the Treasury, who (*vide* Mr. Farrer's letter of December 5th, 1866, above referred to) had authorized the preparation of estimates, the Committee proceeded to order the instruments required for the different observatories, and obtained plans and estimates for the additional buildings at Kew Observatory. The immediate erection of the building at Kew, and outfit of the outlying observatories, is indispensable for the commencement of the operations of the Committee.

The instruments are now nearly ready, but the works at Kew have not been commenced. The cost of these instruments and buildings will be 2,900*l.*, but the outlay would only be requisite in the present year, and consequently forms no part of the current annual expenditure which, the Committee believe, will not exceed the original estimate of 9,900*l.*

With reference to the letter from the Treasury, of date April 17th, which refers to the payment of the salaries of the several (three) officers appointed by the Committee, I am desired to state that the wages of the clerks up to the 31st of March have been paid by the Board of Trade, the vouchers or salary lists being signed in regular course by me as Director of the Meteorological Office.

When the Committee undertook the superintendence of this Office it was distinctly understood that the salaries of the officers and wages of the clerks would be paid by the Board of Trade up to the end of the Financial Quarter, and subsequently out of the annual grant. The Committee having acted upon this understanding hope the arrangement will be carried out.

I have the honour to be, Sir,
Your obedient servant,
(Signed) Robert H. Scott,
Director.

Thomas Gray, Esq., Board of Trade.

P.S.—Having been informed that the accountant of the Treasury is now authorized to pay 2,000*l.* on account under the signature of the chairman of this Committee, an application has been made by me for that sum, as the money is required for defraying expenses already incurred.

Mr. Scott read the following correspondence relating to the franking of letters:—

M. 3374.

Sir,

Board of Trade, Whitehall, 29th April 1867.

With reference to your letter of the 30th ultimo, returning to this office one office seal, two register stamps, and one franking stamp, used by the Meteorological Office when it was a department of this Board, and requesting that the authorities at the General Post Office may be informed of the disuse of the former franking stamps and the substitution of the form enclosed in your letter. I am directed by the Board of Trade to state that before communicating with the Post Office authorities they referred your request for the consideration of the Lords Commissioners of Her Majesty's Treasury.

You will see by the reply, a copy of which is enclosed, that their Lordships are of opinion that they would not be warranted in sanctioning the use of a frank by the Meteorological Office now that it no longer forms part of a public department.

I am, Sir,
Your obedient servant,
(Signed) Thomas Gray.

R. H. Scott, Esq.
Meteorological Office.

M. 3374.

Sir,

Treasury Chambers, 20th April 1867.

With reference to Mr. Gray's letter of the 6th instant, I am commanded by the Lords Commissioners of Her Majesty's Treasury to request that you will state to the Lords of the Committee of Privy Council for Trade that the Meteorological business of that Board having been transferred to a Committee appointed by the Royal Society at the request of the Government, and consequently ceased to be conducted in a public department, my Lords are decidedly of opinion that they could not be warranted in sanctioning the extension to the persons now conducting such business of the privilege of using an official frank for the Meteorological correspondence.

I am, &c., &c.
(Signed) Charles W. Stronge.

T. H. Farrer, Esq.

Resolved—That the following letter be written by Mr. Scott to the Secretary of the Board of Trade:—

Sir, Meteorological Office, 2, Parliament Street,
May 7th, 1867.

With reference to your letter of the 29th ultimo, I am directed by the Meteorological Committee to ask for instructions as to their procedure with regard to the postage of letters sent by the writers unpaid to this office.

At present the majority of our correspondents, both at home and abroad, especially officers in the navy, send their letters unpaid in accordance with the former regulations of the office.

The Committee would request that they should not be called upon to pay the extra charge for postage on unpaid letters, as it is not possible for them to prevent the letters being sent unpaid at least for a considerable period from the date of this communication. In the case of foreign letters the overcharge would amount to a considerable amount.

I am further directed to point out that in the estimate for the expenses of this office now before Her Majesty's Treasury no provision has been made for the payment of postage.

I am, Sir,
Your obedient servant,
(Signed) Robert H. Scott.

Thomas Gray, Esq., Board of Trade.

Mr. Scott read a letter from Captain Blanc, stating that the Panama Mail Company would be happy to forward the wishes of the Meteorological Committee in any way in their power.

Resolved—That the Committee request that the temperature of the sea be taken, and that Captain Toynbee draw up a set of instructions for the purpose, to be communicated to Captain Blanc.

Mr. Scott reported that the Rev. Thomas Kerr, who had been proposed by the Hydrographer as observer at Valentia, had called on him, and that he had expressed his willingness to go to Valentia, his expenses being paid, and personally examine the station with reference to his proposed duties.

The Secretary read a letter from the Secretary of the Underwriters' Rooms, Liverpool, requesting daily weather reports and telegraphic information of gales at Shields, Deal, Penzance, Queenstown, Valentia, Derry.

Resolved—That Mr. Scott reply, stating what stations the Committee have, and asking, with especial reference to Deal, whether these will meet the wishes of the underwriters of Liverpool.

The Committee then adjourned until Monday 13th inst., at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street*, 13*th May* 1867.

PRESENT:

General Sabine in the Chair.

The Hydrographer.
Mr. Gassiot.
Colonel Smythe.

The Director and Secretary to the Committee were in attendance. The minutes of the last meeting were read and confirmed.

Mr. Scott reported that he had received authority from the Treasury to draw the sum of 1,000*l.* on account. Having received this money and lodged it in the Bank of England as desired by the Committee, the following cheques were drawn since the last meeting of Committee:—

Salary for the quarter ending 31st March, R. H. Scott	£200	0	0
Do. do. Captain Toynbee	87	10	0
Do. do. B. Stewart	100	0	0

The following cheques were then drawn:—

For petty expenses	£25	0	0
Travelling expenses, B. Stewart	18	18	4

Mr. Scott stated that he had hopes of succeeding in amending the Yarmouth Observations, but he did not think it would be possible to erect an anemometer there.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, June* 3, 1867.

PRESENT:

General Sabine in the Chair.

The Hydrographer.	Mr. Gassiot.
Mr. Spottiswoode.	Dr. W. A. Miller.
Colonel Smythe.	

The Director and Secretary to the Committee were in attendance.

The Minutes of the last meeting were read and confirmed.

Read—The following letter from the Board of Trade:—

M. 4377.

SIR, Board of Trade, May 31, 1867.

I AM directed by the Lords of the Committee of Privy Council for Trade to state that a large deputation has waited on the Duke of Richmond to urge that some warning should be given of apprehended danger from storms, and I am to ask whether it might not be possible for the Committee appointed by the Royal Society, upon such conditions and under such limitations as they may think necessary, to give effect to a desire which is strongly expressed by many competent and influential bodies and persons.

Robt. H. Scott, Esq., Director, Meteorological Office.

I am, &c.
(Signed) T. H. FARRER.

Resolved—That Mr. Scott reply to Mr. Farrer, stating that his letter regarding the possibility of giving more warning of apprehended danger from storms has been laid before the Committee, and that the subject is under their consideration.

Mr. Scott stated that he had prepared a Report to the Committee with reference to the subject of the above letter.

Ordered—That the Report be printed in the Minutes.

GENTLEMEN, June 3, 1867.

HAVING received on the 1st inst. a letter (No. M. 4377) from the Board of Trade referring to the possibility of "giving some warning of apprehended danger from storms," I have drawn up the following Report on the subject:—

Circular. The Committee, in the circular which was framed at the meeting on March 11, announced that this office was prepared to transmit by post to any port which might require it a copy of the Daily Weather Report free of expense. In addition the circular stated that the office would furnish any telegraphic information which it might have received, on the conditions that the authorities applying would state the precise nature and amount of information required, and would bear half the cost of the transmission of the message.

Treasury letter. The Treasury, by letter to the Board of Trade dated November 30, 1866, decline to sanction any expenditure on the account of storm warnings.

I should therefore urge on this Committee that the written sanction of the Treasury to the proposals of the Committee should be obtained before any plan be finally adopted.

Expense. As regards the question of expenditure I am of opinion that the estimate of 3,000*l.* for telegraphy will be sufficient to cover all expenses connected with any probable amount of meteorological intelligence which may be communicated. At the period at which the cost of storm warnings was highest the total expense for Weather Reports and Warnings did not exceed 2,750*l.* in any one year, so that the margin of 250*l.* may be fairly expected to cover every extra demand on this head for the remainder of the present financial year.

Proposed meaning of warnings. It seems to me, after having given the subject my most careful consideration, and having consulted with the gentlemen in the office who have had charge of the Weather Reports, that this office may without attempting to forecast weather, place outstations in possession of such meteorological information as it may have received on any day. It must most clearly be understood that any telegraphic message of a warning nature is merely meant to imply that *there is a storm existing along a certain region of coast*, say the S.W., *and consequently that there is or may be danger impending at other districts.* Accordingly vessels bound southwards will know what they have to expect, but the crews of local craft, such as fishermen, must be guided as to the immediate risk which they incur by their own observations of the look of the sky, &c., and also by the behaviour of the local instruments, such as fishery barometers with which the coast has been so liberally supplied by the Government.

The meteorological information from which the daily weather reports are framed is not sufficient either in quantity or quality to form the basis of accurate calculations, or of prediction of the direction of the coming storm; it can, however, be depended on to convey information of serious existing meteorological disturbances, and I am convinced may be very greatly improved. My suggestions on this head I shall give subsequently in this Report.

It must of course be admitted that if any selection whatever is made as to the stations to which information is sent on a particular day, a certain degree of prediction is thereby implied: but I think that the experience already attained in the office will authorize such an undertaking, and at all events

the risk to be apprehended arises less from the chance of occasional unnecessary warnings than from the omission of or delay in issuing the warnings at all.

Stations to be warned.

As to the stations to be warned, it will be, in my opinion, desirable for the Committee to ask for instructions from the Board of Trade as to their views of the extent to which warnings shall be issued; whether to all the stations which formerly received them, or whether any change, and, if so, what, should be made; also, as to the question of sending warnings to the colliery districts, as liable to be seriously affected by disturbances of atmospherical equilibrium.

The re-establishment of any system of warnings must take place in the first instance under a circular emanating from the Board of Trade, as by that Board they were at first established and subsequently discontinued.

Local expenses.

If it were in any way possible, it would be very desirable that local authorities (such as Harbour Boards), should bear all the local expenses of hoisting and care of the signals, the cost of the telegraphy alone being borne by this office. In the case of fishing stations in Scotland, where there are no local funds, and no considerable coasting trade, the Board of Fisheries in Edinburgh might be requested to contribute towards the necessary expenditure.

Time required in office to do the work.

As to the time required in this office for doing this extra work, it will be very small. It was never found that storm warnings in themselves, as distinguished from weather forecasts, interfered seriously with the business of the office.

Form of signals.

The simplest mode of conveying the requisite information would be to use the drum alone, and discard the cones entirely, or else to use the two cones permanently attached base to base. The form of warning would be—

Storm, West. South coast of England. Penzance. Hoist drum.

Masters of coasters seeing the drum hoisted would come ashore to hear where the gale was blowing.

Definition of a storm.

The amount of information on receipt of which the issue of a warning would be justified would be *a wind force of* 8 *or upwards, and a considerable and sudden barometrical disturbance.*

Improvements in present weather reports.

As to the improvement of existing information received, this may be effected to a great extent by visiting and inspecting the stations, but additional information is most urgently required.

The extreme readings of the instruments, instead of being sent as at present, should be readings at a definite hour, say at 6 p.m. in general, and any remarkable variation occurring between the regular hours of observation should be sent in addition whenever the observer thinks it requisite.

Afternoon telegrams.

An afternoon telegram is received from Valencia daily; such should also be sent from Nairn, Greencastle, Penzance, and Scarborough. The additional cost of this would be about 50*l.* *See* Appendix B.

Sunday reports.

Serious difficulty arises in framing the weather reports for Monday, from the absence of Sunday reports which come in by post. Many of the observers are not on duty for telegraphic purposes on Sundays, but almost all observe on that day. Accordingly I should suggest that such offices as are open on Sundays should send their messages as usual, and that the others should telegraph the observations for both days on Monday. Arrangements can be made hereafter for the reception and occasional discussion of Sunday messages. The cost of this would be probably about 160*l.*, but I have not data to make an exact calculation.

Progress of storms.

Whenever, at any station, there are appearances of impending danger, such as wind-force above 7, and a barometer falling 0·05 inch per hour, the telegraphist should be instructed to telegraph every two hours until the crisis of the gale, if gale there be, should have passed. By this means alone can the central office gain a knowledge of the rate of culmination and progress of the storm. In the arrangements for *Met. Tel.* p. 7, par 17, telegraphists are directed to perform this duty, but they have rarely if ever attended to it. Its importance cannot be over estimated.

Additional stations; Pembroke. App. C.

The station at *Pembroke* has been discontinued. The situation is a very important one, and I should recommend that it should be re-established. The additional cost would be about 45*l.* for the telegraphy and clerk's allowance.

France; additional stations.

Additional information from the Continent is very necessary. I should recommend that the French authorities should be requested to send us daily reports from Paris, Strasbourg, and Lyons, in return for three additional English stations, so that this office should learn daily the general conditions of atmospherical pressure on the Continent. The existing coast stations give us very insufficient information on this important head. It is absolutely necessary that the central office should be placed in communication with as extended an area as it is possible to work with advantage.

Local weather journal as check.

It is hardly necessary to add that if warnings be issued the local authorities should be requested to keep a regular weather journal, at least of the periods during which the signals were hoisted, and that such journal be sent regularly to the central office for the purpose of testing as closely as possible the correctness of the information which is sent out.

ROBERT H. SCOTT.

APPENDIX A.

ABSTRACT OF ACCOUNTS showing ANNUAL COST of METEOROLOGICAL TELEGRAPHY during Years 1861-6.

	1861.	1862.	1863.	1864.	1865.	1866.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Telegrams sent to office	1,039 10 0	1,757 17 0	1,461 19 1	1,381 5 11	844 6 1	796 4 11
Allowance to clerks	182 15 0	291 0 0	315 4 6	355 17 6	315 16 6	319 8 6
Warnings sent from office	132 13 0	257 17 0	383 0 8	226 17 5	232 8 2	259 4 7
Hoisting signals, porterage, &c.	25 12 0	48 16 0	107 2 1	146 13 6	161 5 0	172 0 3
Erecting signal staffs	123 5 0	94 3 0	25 8 6	36 0 0	51 10 7	29 3 10
Signal shapes and lanterns	266 13 0	161 7 0	49 17 9	18 19 3	63 14 9	63 17 8
Telegraphy with Paris	80 18 0	125 3 0	344 0 3	499 7 1	499 3 9	290 14 9
Telegrams to Jersey	—	—	46 3 0	87 16 3	85 2 10	61 16 10
Other charges, including use of Danes Tower, Flamborough Head	—	—	0 7 10	17 0 0	16 19 0	31 10 0
Total annual expenditure	1,851 6 0	2,736 3 0	2,733 3 8	2,749 16 11	2,270 6 8	2,024 0 1

Appendix B.

Statement showing the Annual Expense of Afternoon Telegrams, formerly required for Storm Warnings.

		s.	d.	
Aberdeen	at	1	4	per message.
Penzance	„	1	4	„
Yarmouth	„	1	0	„
Roches Point	„	4	8	„
Ardrossan	„	1	4	„
Valencia	„	3	4	„
Daily cost		13	0	
311 days at 13*s.*				£202 3 0
Deducting *Roches Point* (now received in morning instead) and *Valencia* (now received in afternoon); 311 days at 8*s.*				£124 4 0
Annual expense *in excess* of present expenditure				£77 19 0

If telegraphic service on *Sundays* be required, 1*s.* extra on each message. 17 messages at 3*s.* 6*d.* each (average) gives 3*l.* per Sunday, or 156*l.* per annum.

Additional.—Messenger to take the messages out.

Appendix C.

Statement showing the approximate Annual Cost of the present System of Meteorological Telegraphy employed for the Purpose of framing the Daily Weather Report.

Telegrams received:

	£ s. d.	Annual Expense. £ s. d.
One each morning from the following 18 Stations :—		
Nairn	50 0 0	
Aberdeen	31 0 0	
Leith	31 0 0	
Ardrossan	31 0 0	
Greencastle	78 0 0	
Valencia	78 0 0	
Roche's Point	108 0 0	
Cape Clear	92 0 0	
Liverpool	16 0 0	
Holyhead	31 0 0	
Penzance	35 0 0	
Plymouth	25 0 0	
Weymouth	25 0 0	
Portsmouth	16 0 0	
Yarmouth	23 0 0	
Scarborough	23 0 0	
Shields	31 0 0	
Heligoland	39 0 0	
		763 0 0
Allowances to Clerks in charge for reporting observations, &c., from 3*s.* to 6*s.* 6*d.* per week	226 0 0	
Cab to Times Office, with Weather Report, daily	15 10 0	
Contingencies:		
Carriage, printing, &c.	25 0 0	
		266 10 0
Telegrams to Paris (for Observatory and Ministry of Marine) from Nairn, Penzance, Scarborough, Yarmouth, Greencastle, Valencia (2), with a précis of remarks	240 0 0	
Afternoon Telegram from Valencia (requested by M. Leverrier)	65 0 0	
Transfer of Copies of Messages from Electric to Submarine Company for Paris	31 0 0	
		336 0 0
Telegrams to Jersey:		
From Paris Ministry of Marine	65 0 0	
Allowance to Clerk in charge	13 0 0	
		78 0 0
		1,443 10 0
Deduct amount paid by Mr. Dornbusch for copy of Weather Report	10 0 0	
Less, the cost of postage	1 6 0	
		8 14 0
Approximate annual expense		1,434 16 0

A draft reply to the foregoing letter of the Board of Trade was made out to be considered at a future meeting.

Read—The following letter from the Board of Trade respecting postal arrangements, *vide* Minutes of May 6, p. 44 :—

M. 3811.

Board of Trade, May 31, 1867.

Sir,

I am directed by the Board of Trade to acknowledge the receipt of your letter of the 7th instant, requesting instructions with respect to the postage of unpaid letters forwarded to the

Meteorological Office, and calling attention to the fact that many correspondents, both at home and abroad, continue, in accordance with the regulations of the former Meteorological Department, to transmit their communications in this way, thereby entailing considerable present and prospective payments for overcharges.

In reply, I am to refer you to the announcement contained in my letters of the 29th ult., viz., that the Lords Commissioners of Her Majesty's Treasury have refused to sanction the use of a frank by the Meteorological Office, as that office no longer forms part of a Government Department.

Looking to this fact, therefore, the Board of Trade think that, under the circumstances detailed in your letter, the Meteorological Office should give notice that all letters addressed to them by the correspondents referred to should for the future be prepaid. Correspondents who incur expenses for postage in work connected with this Board forward from time to time an account of the sums spent, and obtain repayment periodically.

Charges for postage incurred in forwarding letters, &c. to the Meteorological Office might be repaid by the Meteorological Office to their regular correspondents at the end of each quarter in the same manner.

In the case of letters which are not prepaid after due notice has been given, there is, so far as this Board have been able to learn, no other course but for the Meteorological Office to pay the overcharge upon the receipt of the letters.

I am, &c.

R. H. Scott, Esq., Meteorological Office. (Signed) THOMAS GRAY.

Mr. Scott read the following reply, which he had sent to Mr. Gray:—

SIR, Meteorological Office, June 1, 1867.

I HAVE the honour to acknowledge the receipt of your letter of the 31st ultimo, stating, in reply to mine of the 7th ultimo, that the Board of Trade think that all letters addressed to this office should for the future be prepaid; and I have to inform you that this office will instruct its correspondents to prepay letters accordingly in future.

At the same time I beg to draw your attention to the last paragraph of my letter of the 7th ultimo, above referred to, namely, "that in the estimate for the expenses of this office, now before Her "Majesty's Treasury, no provision has been made for the payment of postage."

I have, &c.

Thos. Gray, Esq., Board of Trade. (Signed) ROBERT H. SCOTT.

Resolved—That the above reply be approved.

The Committee then adjourned until Friday, the 7th instant, at 3 o'clock.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, 7th June* 1867.

PRESENT:

General Sabine in the Chair.

Mr. Spottiswoode.	Captain Richards.
Dr. W. A. Miller.	Colonel Smythe.
Mr. Gassiot.	

The Director and Secretary to the Committee were in attendance.

Mr. Scott was instructed to send the following reply to the letter from the Board of Trade of 31st May (See Minutes of 3rd June):—

SIR, June 8, 1867.

IN reply to your letter of the 31st ult., in which you ask "whether it might not be possible for the Committee appointed by the Royal Society" to give "some warning of apprehended danger from storms," I am directed by the Committee to state—

(1.) That though they distinctly decline to prognosticate weather, or to transmit what have been called "*storm warnings*," they are collecting information which they confidently anticipate will enable them sooner or later to frame rules by which such prognostications can be made; and that one of the main objects which they propose to themselves is the advancement of meteorological science in this important practical direction.

(2.) That their observatories for continuous registration are not as yet in practical operation, nor can they be put into operation until the necessary funds have been voted by Parliament.

(3.) That the stations on the coast from which reports are daily received by this Office, and transmitted by it to the daily papers for publication, are in process of careful inspection, with a view to rendering the observations collected more trustworthy.

(4.) That at an early period after commencing their labours the Committee directed the following lithographed circular to be addressed to all parties applying to the office for information on the subject of storm warnings:—

" SIR,

" I am directed by the Meteorological Committee to acknowledge the receipt of
and to inform you that this Office is prepared to forward each day by post, to any port which may require it, a copy of the daily Weather Report, the same as that furnished to the second edition of the London morning papers. This copy will be forwarded free of expense.

" Should the at require regular or occasional telegraphic intelligence, you are requested to inform them that, on receipt of an application stating the precise nature and amount of information required, this Office is prepared to furnish, without unnecessary delay, any telegraphic information which it may have received.

" In the case of telegraphic communications of this nature, half of the expense of the transmission is to be borne by the local authorities.

" I have the honour to be, &c.,

" By Order of the Committee,

" EDWARD SABINE, Chairman. Secretary to the Committee."

" To .

(5.) With the view of collecting and distributing such information the Committee included a sum of 3,000*l.* in their estimate, and they are willing to communicate information to any accessible place upon the terms laid down in their circular, and to an extent limited only by the sum placed at their disposal for the purpose.

The information conveyed by telegraph to each station would be of the following kind, one uniform signal being hoisted on the coast:—

" Storm from West at Penzance and South Coast. Hoist signal."

Masters of coasters and others on seeing the signal might apply to know the nature of the information which has been received from the central office.

I have the honour to be, &c.,

The Secretary, ROBERT H. SCOTT,
The Board of Trade. Director.

Mr. Scott read a letter from Captain A. D. Wood proposing to pay for a barometer which he wished to take with him to California.

Resolved—That in consideration of the long continued and valuable services rendered by Captain Albert D. Wood to this office he be requested to retain the barometer, and that if he should require it thermometers should be sent him to replace those which have been lost.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, June* 24, 1867

PRESENT:

General Sabine in the Chair.

Dr. W. A. Miller.
The Hydrographer.
Colonel Smythe.
Mr. De la Rue.
Mr. Gassiot.

The Director and Secretary to the Committee were in attendance.

The Minutes of last meeting were read and confirmed.

Read—The following correspondence regarding Estimates:—

M. 4524.

SIR, Board of Trade, Whitehall, June 11, 1867.

I AM directed by the Board of Trade to transmit to you the accompanying copy of a letter from this Board to the Treasury, of the 23rd May last,* with respect to the Meteorological Estimates, and a copy of the reply which has now been received from the Treasury.

*Not printed here.

R. H. Scott, Esq., Meteorological Office.

I am, &c.,
(Signed) THOMAS GRAY.

M. 4524.

SIR, Treasury Chambers, June 5, 1867.

I AM commanded by the Lords Commissioners of Her Majesty's Treasury to acquaint you, for the information of the Lords of the Committee of Council for Trade, in reply to your letter of the 23rd ultimo, and its inclosures relative to the amount of the Estimates of the cost of Meteorological Researches, to be undertaken by a Committee appointed by the Royal Society, at the request of the Government, that my Lords cannot sanction a greater expenditure during the present financial year for Meteorological Observations and Experiments than the amount named in the Estimates will cover.

My Lords will, however, consent that for these purposes the sum of 570*l.*, expressed in the Estimates to be "for Meteorological Services under the Admiralty," shall be available for expenditure by the Committee appointed by the Royal Society, at the request of the Government, in addition to the sum of 10,000*l.*

I am to observe that, in assenting to insert the latter sum in the Estimates for the current year, my Lords were aware that they were proposing a less sum than had been estimated for, and they intended that the arrangements to be made by the Committee should be curtailed accordingly. It now appears that the Committee anticipated the decision of this Board, as to the exact amount to be proposed in the votes, when they gave orders for instruments, &c., to be made.

My Lords cannot hold themselves responsible for these orders, and can only regret that they were given before the Committee had ascertained the precise amount of public money that they could look forward to for the purpose.

To T. H. Farrer, Esq.

I am, &c.,
(Signed) GEO. A. HAMILTON.

Mr. Scott was directed to send the following reply to the Board of Trade:—

SIR,

I AM directed by the Meteorological Committee to acknowledge the receipt of your letter, M. 4524, of June 11, 1867, enclosing a copy of one from the Board of Trade to the Treasury, of May 23rd, with the reply of the Treasury thereto.

I am further directed by them to state that in accordance with the instructions contained in the reply of the Treasury, they will curtail their arrangements so as to keep within the amount of 10,570*l.*, now sanctioned by H.M.'s Treasury.

The Secretary, Board of Trade.

I am, &c.,
(Signed) ROBERT H. SCOTT, Director.

Mr. Scott submitted an amended scheme of Estimates (see Minutes of the Committee, Jan. 21, 1867).

Read—A letter from the Board of Trade bringing before the notice of the Committee and inviting their remarks on an application to Government from the Scottish Meteorological Society for funds to enable them to reduce the observations made at certain Scottish stations in addition to those already reduced.

Resolved—That Mr. Scott be requested to send the following reply to the Board of Trade:—

"The Meteorological Society of Scotland is a private scientific society, furnishing information to the Registrar-General of Scotland. The present application is for the reduction of the observations from 17 existing stations of which the reports do not at present appear in his Reports. The annual sum proposed (10*l.* 4*s.*) seems very moderate. If it be the desire of the Registrar-General of Scotland that the observations should be thus extended, it appears to this Committee that the regular course would be for the application to be made through that officer to Her Majesty's Government."

Mr. Scott submitted to the Committee a code of signals suggested by Captain Toynbee, for the purpose of telegraphing meteorological information.

Mr. Scott submitted an application for five sets of instruments from the Harbourmaster at Shanghae, which he proposed to use on the Yang-tsee.

Mr. Scott, in reply, to send him one set of instruments, and to state in addition that the Committee will undertake to verify any instruments that he may send them for that purpose.

Mr. Scott submitted an application from Gainsborough for a fishery barometer. To reply, that Gainsborough not being a fishing port, does not come within the list of places entitled to receive such instruments.

Mr. Scott submitted an application from Mr. Blanford, Secretary of the Meteorological Committee of Calcutta, for information bearing upon the late Calcutta cyclone.

Resolved—That Mr. Scott send him any extracts from logs in the Office that may relate to the Calcutta cyclone.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, July* 15, 1867.

PRESENT:

Dr. W. A. Miller in the Chair.

Captain Richards.	Mr. De La Rue.
Mr. Spottiswoode.	Colonel Smythe.
Mr. Gassiot.	

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Read—The following letter from the Board of Trade:—

M. 5273.

SIR, Board of Trade, Whitehall, 11 July, 1867.

I AM directed by the Board of Trade to state, for the information of the Committee of the Royal Society, that they entirely approve of the proposal of the Committee that a portion of the cost of sending telegraphic information concerning storms should, as a general rule, be borne by the ports which desire such information.

At the same time the Board of Trade are of opinion that in the case of poor fishing villages which are unable to find funds for the purpose the Committee might properly send the information gratis, and I am to request that you will inform the Board of Trade whether, if the Board of Trade were to undertake to select and recommend places of this description to the Committee, the Committee would in those cases furnish the information without requiring part payment.

I am, &c.

R. H. Scott, Esq., Director, Meteorological Office. (Signed) THOMAS GRAY.

Resolved—That Mr. Scott be requested to send the following reply:—

Meteorological Office, 2, Parliament Street,

SIR, 15th July 1867.

I HAVE the honour to acknowledge the receipt of your letter of the 11th instant (M. 5273. In reply I am directed by the Committee to inform you that they are prepared to transmit the telegraphic intelligence of weather, alluded to in their letter of the 8th June, gratis to poor fishing villages if the Board of Trade will undertake to give, from time to time, the names of any stations which are to be placed on the free list.

The Committee have in contemplation a scheme of signals for Weather Reports, and as soon as it or any other scheme is adopted, they would suggest that the Board of Trade should present to each station a complete set of signal shapes and gear.

In the opinion of this Committee neither the Board of Trade nor this office should be responsible for any expense whatever connected with the maintenance of the gear, or with the wages of the several persons charged with the management and hoisting of the signals.

The Board of Trade are aware that there are no funds at the disposal of this Committee which would be available for the preliminary outfit of the stations.

I am, &c.

(Signed) ROBERT H. SCOTT, Director.

Thos. Gray, Esq., Assistant Secretary, Board of Trade.

Read—A letter from Captain Toynbee regarding signals and weather telegrams.

Resolved—That the Hydrographer and Colonel Smythe be appointed a Sub-Committee to consider Captain Toynbee's suggestions.

Mr. Scott reported that in consequence of his having received an unsatisfactory answer from Cape Clear he had requested the Coast-guard officer at Skull to inspect the station at Cape Clear.

Approved.

Mr. Scott reported a correspondence between M. Leverrier and himself regarding telegraphic communications.

Mr. Scott laid before the Committee a letter from Mr. G. Shepherd to the Board of Trade.

Mr. Scott read the following report of his visit to the stations at Weymouth and Portsmouth, which was approved and ordered to be printed in the minutes :—

REPORT.

I visited the Telegraph Station at Portsmouth on the 3rd instant. It is situated on the "Hard." Mr. Hardy, the clerk in charge, had never received any special instructions in his duties as observer, but had taught himself, with the help of some information given by the clerk at Weymouth.

There were three barometers in the office, the readings of which agreed with each other. I brought one of them away, as I considered that two were quite sufficient.

Mr. Hardy kept a record of the readings at 2 p.m. I desired him to send up the readings at 6 p.m. as second readings, and in case of any extraordinary rise or fall to make a special mention of its amount in the message. Also in case of storms to send additional messages.

The wind direction is taken from the vane in the dockyard, which is set according to geographical bearings. The force of the wind is estimated, but the locality is not well situated to give true results as to force as the Hard is sheltered from the E. wind.

The thermometers are attached to a board under a shed in Mr. Hardy's garden. They are themselves in good order, but are not sufficiently exposed. The wet-bulb thermometer was not properly managed, as it was coated with calcareous matter from the use of hard water. When cleaned its readings agreed with those of the dry-bulb instrument. I instructed Mr. Hardy in the management of this instrument, and would suggest to the Committee that a louvre-boarded case similar to that supplied to Yarmouth should be sent to Portsmouth to be affixed to the front of the shed in which the instruments are now placed.

The rain gauges were in a pretty good position on a low wall in the garden of Mr. Hardy's house. One was bulged and dinted. I ordered it to be returned.

I visited the Station at Weymouth on the 4th inst. Mr. Silk, the clerk in charge, has taken a great interest in the instruments ever since the station was established. The office is on the Esplanade.

The barometers, two in number, did not read exactly alike, but the difference was very trifling. Mr. Silk was in the habit of reading at 2 p.m. I directed him to forward readings at 6 p.m., as in the case of Mr. Hardy at Portsmouth.

The wind direction is reported geographically by taking the bearings of the prominent landmarks in sight, and then watching the motion of the lower clouds. The force is estimated by the sea disturbance outside the bay as seen through a telescope.

The thermometers are in good order, clean, and well kept, but they are badly placed, as there is a board immediately in front of them, and they are liable to be affected by smoke from a chimney.

I advised Mr. Silk to put them up every morning for an hour in the yard of the inn, as is the practice at Plymouth. The max. and min. thermometers might perhaps be kept in the inn garden, where the rain gauge is now placed. The position of this instrument is good as regards exposure, but I am not sure that it is protected against occasional interference with its correctness. A better locality might perhaps be found for it.

I should suggest that if possible a vane or an anemometer might be placed on the top of the Royal Hotel, where the telegraphic office is situated. This would probably give good results.

July 5th, 1867. ROBERT H. SCOTT.

Resolved—That Mr. Scott be authorized to take such steps to improve the observations at Portsmouth and Weymouth as he may think necessary.

Mr. Stewart mentioned that he had nearly completed a report regarding aneroids.

Resolved—That the report be printed in the minutes. Copies to be sent to the various members of the Committee.

Resolved—That in consideration of the Polytechnic Institution of Falmouth having undertaken to erect a building suitable for the proposed Meteorological Observatory, the total annual allowance to it for meteorological purposes (dependent on the passing of the estimates) shall be 250*l*., to commence from the time when the observatory is in actual working order.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE

2, *Parliament Street, Monday, August* 5, 1867.

PRESENT:

Dr. W. A. Miller in the Chair.

Mr. Gassiot. | Colonel Smythe.

The Director, the Marine Superintendent, and the Secretary were in attendance.

The minutes of the last meeting were read and confirmed.

The following report of the Sub-Committee appointed to consider Captain Toynbee's suggestions (see Minutes of July 15) was read:—

The Sub-Committee met at this office on Monday, July 29, at 3 o'clock.
Present, Capt. Richards and Col. Smythe.
Dr. Miller and Mr. Gassiot also attended.
Mr. Scott and Capt. Toynbee were in attendance.
Capt. Toynbee's letters to the Committee on the subject of Weather Signals were read, and after considerable discussion it was decided to obtain plans and estimates for three sets of Semaphore signals on a plan suggested by Capt. Toynbee.
Mr. Scott was directed to write a letter to Mr. R. C. May, C.E., of Great George Street, requesting him to furnish the plans, &c., required.

The plan referred to in this report was laid before the Committee. Captain Toynbee, at the request of the Committee, made some remarks upon it, and gave also a verbal explanation of the steps he was taking, in order, if possible, to establish weather laws.

Resolved—That Mr. May be requested to make a signal staff as a model, full size, with such modifications as may suggest themselves to Mr. Scott and Captain Toynbee. Cost not to exceed 25*l.*

Read—The following letter from the Board of Trade:—

M. 5426.

SIR, Board of Trade, Whitehall, 5th August 1867.

I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 15th ult., stating that the Committee of the Meteorological Department are prepared to send telegraphic intelligence of weather gratis to poor fishing villages to be named by this Board; and suggesting in connexion with a scheme for weather reports in contemplation by the Committee, that the Board of Trade should present to each station a complete set of signal shapes and gear.

In reply I am to state for the information of the Committee that the Board of Trade are willing to hand over to the Meteorological Committee the old signals, gear, &c. supplied under the direction of Admiral Fitzroy, but that they have no funds at their disposal for the purchase of new signals.

I am to add that the Board of Trade agree with the opinion of the Committee that neither this Board nor the Meteorological Department should be responsible for any expense whatever connected with the maintenance of the gear or with the wages of the persons charged with the management and hoisting of the signals.

I am, &c.
(Signed) C. CECIL TREVOR.

Robert H. Scott, Esq., Meteorological Department.

Resolved—That Mr. Scott be requested to reply as follows:—

SIR, Meteorological Office, 7th August 1867.

I AM desired by the Meteorological Committee to acknowledge the receipt of your letter of the 5th instant (M. 5426) relative to the supply of signal apparatus to the stations to which it is proposed to send intelligence of the weather from this office.

I am, &c.
(Signed) ROBERT H. SCOTT.

C. Cecil Trevor, Esq., Board of Trade.

Read—A communication forwarded from the Board of Trade, being a letter from Prof. David Thomson, of the University of Aberdeen, to the Duke of Richmond, stating that he has received no communication from the Meteorological Committee relative to the establishment of a meteorological observatory at Aberdeen.

Read also,—A letter from General Sabine to Mr. Scott relative to this communication.

Resolved—That Mr. Scott do forward the following minute to the Board of Trade:—

The correspondence relative to the establishment of a Meteorological Observatory at Aberdeen was carried on prior to the nomination of the committee, by Lieutenant-General Sabine, the chairman, who is at present in South Wales.

In a letter received from him to-day he says:—

"I have read Dr. David Thomson's letter with great satisfaction, as it promises to supply us by-
" and-bye with a competent superintendence of a Meteorological Observatory at Aberdeen, working
" with the same intruments and methods as at Kew. In naming Aberdeen originally as one of the
" stations, I had in view such efficient superintendence from Dr. Alexander Thomson of Banchory
" House, with whom I had had frequent correspondence in relation to the subject, but that most
" respected and valuable man has fallen into such a state of health that we can no longer look for such
" assistance from him."

Since the nomination of this Committee no communications whatever have been received by this office relative to the observatories in the north of Scotland.

Mr. Scott submitted a work presented by Capt. De Rostaing, Chief of the Meteorological Department, Ministry of Marine, Paris, on the agreement of the predictions of wind made by this office for the French coasts, in the winters of 1864-5, 1865-6, with the actual weather experienced.

Resolved—That Mr. Scott express the thanks of the Committee to M. De Rostaing, and assure him that, though this office does not now foretell weather, the Committee will take care to keep the French Government informed of any steps which they may take towards the establishment of weather telegraphy.

The bank book was laid on the table by Mr. Scott.

Mr. Scott submitted the following accounts; cheques were ordered to be drawn in payment thereof, viz.:—

Elliott Brothers (instruments) - - -	£3	17	0
Negretti and Zambra, ditto - - -	6	11	6
E. Higgs (carpenter) - - - -	16	15	6

Resolved—That in consideration of the Glasgow observatory having undertaken to become one of the proposed meteorological observatories in connexion with this Committee, the annual allowance to it for this year for meteorological purposes (dependent on the passing of the estimates) shall be at the rate of 250*l.* per annum, to commence from the time when the observatory is in actual working order.

Mr. Stewart presented the following report regarding the state of progress of the instruments and observatories:—

REPORT.—Central Observatory.

The anemometers ordered are now ready for delivery at Kew—one set of barographs and thermographs will, it is hoped, be ready in a few days, and the other sets thereafter as soon as desired.

It has been suggested by several members of the Kew Committee, that as theTreasury have curtailed to some extent the meteorological estimates, it is unadvisable to seek to construct the large building contemplated at Kew, and it was thought that the best plan would be to keep the photoheliograph where it is and erect the new anemometer above the dome. As much time had been already lost, the superintendent was asked to prepare the erection for the anemometer without delay. This is now being done. It is proposed to use cast-iron supports, experiments having shown that these being fixed are without sensible injury to the magnetographs in the basement.

It has also been proposed to fit up the out-house at present only occasionally used for the verification of magnetographs so as to make it also available for the verification of meteorological self-recording instruments—this is being done. Finally it was thought that the sum of money obtainable from the Treasury might be best spent in building a small house containing a work room and carpenter's room outside, and removing to this house all the moveable iron of the observatory. The Kew thermograph has now been ready for some time, but instead of putting it into regular operation it has been thought advisable to make such improvements as may occur either to myself or to Mr. Beckley, especially as up to the present time these improvements could be easily adapted to the other instruments in course of construction.

A comparison of the Kew and Oxford barograph curves has shown that there is probably a slight adhesion of the mercury to the sides of the Kew tube; this circumstance, added to the fact that the instrument is not in other respects the same as those supplied to the other observatories, has induced me to propose that it should be dismounted and one of the new instruments put in its place.

Outlying Observatories.

The following is the state of progress with regard to these observatories:

Stonyhurst.

The photographic arrangements are complete at Stonyhurst, and the observer, the Rev. W. Sidgreaves has received photographic instruction at Kew. I have also had a visit from the Rev. R. Vaughan, who has taken the necessary measurements for the piers and other masonry work connected with fitting up the instruments at Stonyhurst. These fittings are being made so that when the instruments are verified at Kew no time may be lost in erecting them at Stonyhurst.

Glasgow.

I have also had a visit from Mr. Grant's assistant for the purpose of taking the necessary measurements. In a short time it is hoped that a set of instruments will be ready so that Mr. Grant's assistant who is to visit Kew again, may at the same time receive photographic instruction, carry back his own instruments, and erect them at Glasgow without delay, the fittings having in the meantime been made.

Armagh.

I have had correspondence with Dr. Robinson as to what time his assistant may be expected here. Dr. Robinson, however, declines to engage his assistant, who is at present otherwise engaged, until the estimates have passed. I have also had correspondence with him regarding a probable alteration in the time scale of his anemometer so as to make it similar in this respect to the other instruments. This alteration will be made.

Falmouth.

The proposed observer at Falmouth, Mr. Squire, has received photographic instruction at Kew. The plans of the proposed observatory at Falmouth have been examined at Kew, and are good in every respect, but the building itself will not commence until the meteorological estimates shall have passed the House of Commons.

(Signed) B. STEWART.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, August* 12, 1867.

PRESENT:

Dr. W. A. Miller in the Chair.

Mr. Gassiot. | Colonel Smythe.

Mr. De La Rue.

The Secretary of the Committee was in attendance.

The minutes of the last meeting were read and confirmed.

Resolved—That application be made to the Treasury respecting payment of the balance of the grant for the current year (8,820*l.*) made to the Meteorological Committee, this having now been sanctioned by the House of Commons.

Mr. Scott reported that he had engaged one of the Corps of Commissionaires for the duty of taking round the daily weather reports to the newspapers, thereby setting free one of the clerks for regular office work.—Approved.

Resolved—That the Secretary of the Committee write to Professor Thomson, of Aberdeen, as follows:

SIR,

A LETTER from yourself to the Duke of Richmond has been communicated to the Meteorological Committee by the Board of Trade, from which the Committee gather that you would be willing to undertake the superintendence of a meteorological observatory on the plan laid down by the Committee. They regret that anything like a reflection should appear to have been cast upon the University of Aberdeen, the statement respecting which entirely arose from a misapprehension.

If the Committee are correct in so interpreting your letter, it would be necessary that you should know what the methods for automatic registration, tabulation, &c., adopted by the Committee, at present are. If you should not be likely soon to be in London it might be convenient for you, with this object in view, to visit at an early opportunity, Professor Grant, of Glasgow, who is now arranging an observatory on the plan of the Committee, and who has expressed to them his readiness to give you every information. If you should find upon consideration that you can cooperate with the Committee, they would be obliged if you would communicate with me, in order that the necessary arrangements may be made with as little delay as possible.

(Signed) B. STEWART,
Secretary.

Resolved—That the Kew Committee be requested to construct an apparatus to be used in connexion with one of the instruments at Kew, for the purpose of testing and verifying aneroid barometers. Expense not to exceed 20*l.*

Resolved—That Mr. Stewart be authorized to inform the directors of the outlying observatories that the meteorological estimates have been sanctioned by the House of Commons.

Mr. Stewart communicated the following information regarding the outlying observatories.

Stonyhurst.

The observatory at Stonyhurst will be ready to begin work very soon after the instruments arrive.

Armagh.

A structure will probably have to be constructed for the photographic and instrumental rooms. This structure may probably be finished within two months from this date.

Glasgow.

The operations connected with the fittings for the instruments and the preparation of the photographic room are in progress, and may probably be finished by the end of this month.

It was reported that the following cheques had been drawn:

£22	19*s.*	for Kew verifications.
£26	0*s.*	for Kew barograph curves up to June 30.
£108	18*s.* 5*d.*	for the British and Irish Magnetic Telegraph Company.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, August* 26, 1867.

PRESENT :

Dr. W. A. Miller in the Chair.

Mr. Gassiot. | Mr. De la Rue.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

The Director presented the following Report of his journey to Valencia :—

REPORT.

I was accompanied to Valencia by Mr. Kerr, and we went round the island together in order to select a site for the future observatory. The best locality is on the east side, near Knightstown, and I have applied to the Knight of Kerry to ask what proposals he could make as to the accommodation of the instruments and of the director of the observatory.

The following is an extract from my letter :

Extract. Dublin, August 1867.

As to our new observatory I looked at Mr. George's house, which might do if we could get it; if not, I suppose something must be built. We do not want much more than an ordinary dwelling house, with an instrument room facing north. Our grant being annual would not allow us to build, so that I write to ask if you have any proposal which you could make to the Committee as to housing the observer and the instruments at a fair rent. Any spot near Knightstown would probably do, as it is more clear of hills than anywhere else on the island. Our observer and his instruments will be at Valencia as soon as Valencia can receive them. I think that I may say that, and as soon as you wish I shall put you in communication with him. Please send me an answer to London if you can by Monday. I could not possibly write sooner.

(Signed) R. H. Scott.

P. Fitz-Gerald, Esq., Knight of Kerry.

I have the honour to submit his letter :

My dear Sir, Derwent Island, 24th August 1867.

Just received your note from Dublin. I shall find out from Mr George if he will give up the house he now holds from me, but does not occupy, and if you will be so good as to give me Mr. Kerr's address, I will let him know Mr. George's answer. Failing this house, if you or Mr. Kerr give me the dimensions of the house that is needed, I shall find out whether I can build or get it built, previously submitting to the Committee the rent expected on a lease of, say, 15 years. Did it occur to you to consider whether in case it became necessary to build (which of course would require some months), a temporary arrangement might be made to rent a portion of the hotel for the winter and spring months?

If I do not hear from you I shall put myself in communication with Mr. Kerr, as I suppose a letter to your office would reach him.

I am, &c.,
(Signed) P. Fitz-Gerald,
Knight of Kerry.

P.S. Will you be so good as to say if Mr. Kerr is authorized to make arrangements as to rent, and if not, who in your absence is so empowered, as it would be necessary that such things should be clearly understood before I take up the house from Mr. George, in case he should be willing to surrender it.

To R. H. Scott, Esq.,
Meteorological Office.

Mr. Kerr has professed his willingness to accept the post at a salary of 250*l.* per annum, with apartments. Such assistance as may be required in the observatory to be provided by the Committee.

Robert H. Scott.

Resolved—That Mr. Scott be requested to negociate with the Knight of Kerry respecting a house.

Resolved—That the Reverend Thomas Kerr be engaged for this year by the Meteorological Committee as director of their proposed observatory at Valencia, at the salary of 250*l.* per annum, to commence from 15th August, and that the rent of the house for the observatory and observer shall not exceed 40*l.* per annum, and that there be an allowance for an assistant of 10*s.* a week.

The instruments to be fitted up; chemicals, &c., provided by the Committee.

Mr. Scott presented the following Report regarding the Irish stations which he had recently visited :—

REPORT.

I have the honour to report that I have completed my inspection of the Irish stations and of Holyhead. I left London on the evening of the 10th and returned on the 23rd.

In Dublin I called on the engineer of the Magnetic Telegraph Company, Mr. B. D. Watlock, and was by him introduced to the superintendent, Mr. Sanger, to whom I stated my intention of inspecting the stations in Ireland, and from Mr. Sanger I have received every possible facility for prosecuting the objects of my inspection.

The Irish stations of the Magnetic Telegraph Company which send daily weather reports are *Greencastle*, *Valencia*, and *Cape Clear*.

Greencastle.—Mr. John Kelly, clerk in charge. Here there are two barometers which are in good order and placed in a good light.

The ordinary thermometers are also well placed, but the wet-bulb thermometer was badly mounted, being enveloped in a thick paraffine lamp wick.

There are no maximum or minimum thermometers at the station, and the extreme temperature reported is therefore valueless.

The rain gauge is well placed and in good order. The wind is reported by geographical bearings, taken from natural landmarks, which were correctly chosen. The situation is well placed for observations on wind, but the sea disturbance reported from it is worthless, as the station is sheltered from the open sea to the W. and N.W. by Innishowen Head, and is only exposed to the N.E.

I found the instruments at the station all well cared for, but several of those originally issued to the station are not there now. These are, bar. B.T. 198, therm. B.T. 473, max. therm. 3403, min. do. 2475.

Mr. Kelly appears very intelligent, and when the station is properly supplied with instruments will, I have no doubt, send very useful information.

Valencia.—Clerk in charge, Mr. Thaddeus Sullivan. He is extremely intelligent, and himself drew my attention to some slight discrepancies in the readings of his instruments.

The station is at Foilhummerum, near the edge of a cliff 120 feet high.

The two barometers are clean and well cared for, but one appears to be out of order, as it reads ·03 of an inch too low when tested by the check barometer at the station and by an accurate aneroid which I took with me. The other instruments are all correct, but the wet-bulb thermometer is kept too wet from the use of a thick wick.

I find that one of the spare rain gauges at this station has been withdrawn by an unauthorized person, and I have requested its immediate restoration.

Cape Clear.—Clerk in charge, Mr. Shipsey, who had been sent to that station by the Magnetic Telegraph Company, as soon as it was discovered that the duty of reporting at Cape Clear had been entrusted to his brother, a boy of 12 years of age.

The instruments are in good order, but the wet-bulb thermometer was not mounted at all, as the clerk stated that no wick or water vessel had been supplied. There was no maximum thermometer, as it and the third barometer were stated to have been taken to Cork by Mr. Black, district superintendent, to be repaired. I have requested Mr. Sanger to have these returned to London immediately, as Mr. Black was not aware that incorrect instruments should be returned to the central office.

The sea disturbance reported from Cape Clear is very valuable if correctly estimated, and also the wind; but the telegraph station is badly situated for wind observations; however, there is a hill close to the house where correctness both of force and direction could be secured. The present clerk is ignorant of the points of the compass, having pointed due S.W. when asked by me to show a landmark lying W. on the opposite hill.

The other two stations visited belong to the Electric Telegraph Company, viz., *Roche's Point and Holyhead*.

Roche's Point.—Clerk in charge, Mr. Kennedy: he is of very good ability, but has received very little special instruction. He is most willing to learn. The barometers are not very well placed as to light, and the third instrument was out of order, and accordingly withdrawn by me.

The wet-bulb thermometer was plunged in water and swathed in a very thick wick. The maximum and minimum thermometers were reported to have been broken immediately after their arrival at the station.

Thermometers No. 335, 1112, and 29 were not at the station, though originally issued to it.

This station when once properly established will give, as far as I can see, good results.

Holyhead.—The clerk, Mr. Andrews, was absent on leave; Mr. Parr was acting for him. The instruments are all in perfect order, but the thermometers are very badly placed, being attached to the walls of the roofed portion of the station, where they are also liable to be heated by the proximity of engines.

From Mr. Massingberd, the station master, I obtained permission to have them erected in a proper situation.

The sea disturbance taken here is worthless, being that observed in the harbour and the sheltered part of the bay. The railway station is well placed for wind observations, but there is no weathercock anywhere near it.

There are no weathercocks at any of the above stations, and it would be very important to have such erected if possible by local authorities.

From Mr. Sanger, whom I revisited in Dublin on my return from the south, I received the assurance that the company would do all in their power to render the service thoroughly satisfactory. As regards Cape Clear, he has promised to have the present clerk removed, and will send another person to take charge of the instruments as soon as he receives from this office a statement that the gentleman proposed by him for the station is approved by this office. I should suggest that the weekly allowance for Cape Clear should be 5*s*., as the island is very difficult of access, so that there is no society for the clerk.

The other matters as regards these stations can I think be set right without difficulty.

ROBERT H. SCOTT.

Resolved—That the report be approved, and that Mr. Scott be empowered to carry out the recommendations which it contains.

Mr. Scott reported that he had had an interview at Killarney with Mr. John Deane, secretary of the Anglo-American Telegraph Company, who stated that the Atlantic Telegraph Company would be probably willing to furnish daily weather reports from *Heart's Content*, either gratis or at a moderate cost, provided the Meteorological Committee would supply a set of meteorological instruments for the purpose.

Resolved—That Mr. Scott be authorized to state that the Committee will supply a set of instruments to be used at *Heart's Content* if the company will undertake to send telegraphic weather reports.

The Secretary reported receipt of a note from the secretary to the Local Marine Board, Glasgow, acknowledging receipt of a circular regarding storm signals, but deferring in the meantime further consideration of the subject.

Resolved—That the Reverend Dr. Robinson be requested to engage an assistant for this year at the rate of 100*l.* per annum (salary to commence from 1st September) and to proceed with the necessary arrangements for the reception of the instruments, furnishing the Committee at his earliest convenience with the probable cost thereof.

At the application of the chairman of the Kew Committee—

Resolved—That the sum of 250*l.* be placed at the disposal of the chairman of the Kew Committee for the expenses of the central observatory for the current year, commencing on 1st April 1867.

The following cheques were drawn :

Travelling expenses, Messrs. Scott and Kerr - -	£27	19	1
Agency for Liverpool, H. Smart - - -	15	4	8
Submarine Telegraph Company, S. Clare - -	68	17	4
Electric Telegraph Company, H. Weaver - -	146	9	7

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Thursday, October* 17, 1867.

PRESENT:

General Sabine in the Chair.

Dr. W. A. Miller. | Mr. Gassiot.

The Hydrographer.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

The Director presented the following report of his journey to the remaining Telegraphic Stations, with the exception of Liverpool.

REPORT.

Scarborough.—I have to report that I visited the Telegraphic Station at Scarborough on the 3rd inst. Mr. Shaw, the clerk in charge, has hitherto kept the instruments at the railway station, although the head office is situated in the town. I have directed him to remove the barometers to the head office, as in their present position they are in a bad light, and are liable to injury, both which inconveniences will be obviated by the change proposed.

The instruments are all in very good order, and the wet bulb thermometer deserves special notice, as it was correctly managed. This is the only station at which I have found this instrument satisfactory. The position of the thermometers was bad, as they were placed under the roof of the station. I have suggested to Mr. Shaw that he should place the thermometers on the north wall of a small garden-house in the garden which already contains the rain gauge. Mr. Shaw tells me that there will be no difficulty in making this change.

Scarborough is well situated for observations of the wind and of sea-disturbance, as it is well exposed.

Shields.—North Shields was visited on the 4th; the instruments are in charge of Mr. Allaway. The barometers are in good order, but the thermometrical observations are very unsatisfactory. As to the instruments themselves, the metal scales have been very much corroded, and the tubes have got loose from the scales, so that readings are nearly useless. New instruments must be supplied.

As to position the thermometers and the rain gauge were situated in a narrow back yard, so that their indications were nearly worthless. I have directed Mr. Allaway to have the thermometers and the rain gauge put up in the yard of his own residence, where a very good situation may be had. The wet-bulb thermometer was kept too moist.

Shields is well situated for observations of wind, but the reports of sea-disturbance are not very satisfactory, as the observations of it are taken from a distance of nearly a mile; the open sea, outside the mouth of the river, is at that distance from the town.

Leith.—Leith was visited on the 5th. Mr. Bolton was in charge of the instruments, but had never received any special instruction whatever in their use.

The barometer was in good order. The thermometers were placed above the door of the office, and faced to the N.E. They were thickly covered with dust from the street, so that they were nearly absolutely useless. The maximum and minimum thermometers were never used.

I believe that a good situation may be obtained for the thermometers on the wall of a small office in the docks. The rain gauge is at present on the roof of this office, so that probably the dock authorities would grant permission to suspend the thermometers also on the wall.

The wind is reported correctly as to bearings, but I am not satisfied as to the correctness of the estimate of its force. As to sea-disturbance, Mr. Bolton has been in the habit of estimating that by his observation of the wind, without any direct observation of the sea itself. Sea-disturbance from Leith is of very little value, as the port lies so far up the Firth.

Aberdeen.—Aberdeen was visited on the 7th. Mr. Gibson, the local superintendent of the Electric Telegraph Company for the northern district, was in charge of the instruments, and I am glad to say that the station is in very good order, the only thing which had to be set right being the wet bulb thermometer, which was kept too wet by the use of too thick a wick. The thermometers and rain gauge are well placed in Mr. Gibson's own garden. The wind-force can be correctly observed, but the report of sea-disturbance is not satisfactory, as the estimate of it is made from a distance of more than a mile, and without observation of the breakers.

Nairn.—Nairn was visited on the 8th. The instruments are in charge of Mr. Penny, the schoolmaster. They are in very good order. Mr. Penny has erected in his garden a small shed for the thermometers similar to that employed by the Scottish Meteorological Society at their stations. The wet-bulb thermometer was as usual imperfectly mounted.

Mr. Penny has not been in the habit of reporting snow-fall regularly, as he used to allow the snow to melt of itself, only reporting occasionally. This is now set right.

Nairn is well placed for wind reports, and also for observations of sea-disturbance, but in this latter particular the reports are not of much value, as the station lies so far up the Firth.

Nairn is on the whole a satisfactory station, and, with Aberdeen, ranks among the best which we have.

Ardrossan.—Ardrossan was visited on the 10th. Mr. F. Love was in charge of the instruments. The barometers were in good order, but the thermometrical observations were entirely worthless. The maximum and minimum thermometers were not used at all, and the others were in a closed box under the roof of the station. I think that it will be necessary at Ardrossan to provide a wooden shed for the thermometers, as there is no wall having a N. aspect which is available for the maximum and minimum thermometers. A site might probably be obtained for the erection of such a shed, in the garden where the rain gauge is placed. The station is well placed for observations of the wind and of the sea, but this latter never can attain any considerable force except with winds from S. to S.W., and even then it is sheltered from the Atlantic by the Mull of Cantire.

Oct. 16, 1867. ROBERT H. SCOTT, Director.

Resolved—That this report be approved, and that Mr. Scott be empowered to carry out the recommendations which it contains.

The Director submitted Captain Toynbee's report to him of his visit to the station at Liverpool as follows:

Mr. Samuel Jones had charge of the meteorological instruments; he was in attendance, and gave me all the information I required; he seemed intelligent, and anxious to supply us with reliable observations, but needed instruction.

The *barometers* were fairly placed and agreed; No. 141 was used for reporting, No. 140 being kept as a stand-by.

The *thermometers* were very badly placed against a wall which faced the east, so that the morning sun shone full upon them. The wet-bulb (No. 855) was covered with a piece of very thick woven cotton; it was black with soot and slime, and had not been cleaned since it was first placed there last January. I refitted it, and explained how it was to be kept clean.

The *rain-gauge* was in an inaccessible place on the top of the building, with a pipe leading down the wall; in case of snow it could not be got at for melting.

The *direction of the wind* was obtained from a dial at the Woodside Ferry. I visited the Ferry, and through the kindness of Mr. Barker, the manager, was enabled to test it with a pocket compass, when I found that it gave the *true* direction of the wind, as I had been previously told by Mr. Barker, an old officer of the late Indian Navy.

Mr. Jones gave the *force of the wind* much too low, for instance, on the morning of the 12th inst., after crossing the river at 8 a.m., and noticing that the wind's force was about 5, I found that Mr. Jones had telegraphed 1. As he crosses the river every morning, I gave him Beaufort's scale, with the amount of sail which a fair sailing ship in good trim would carry to the different forces when on a wind. Being in constant communication with sailors, their opinion on this point would help him to a more correct estimation.

Mr. Jones got the height of the barometer cistern above the level of the sea from Mr. Hartnup. He leaves the office at 3·30 p.m. each day, but would instruct another clerk to set the barometer each evening at 6 p.m.

I have written to request Mr. Bright, the secretary of the company, to allow the thermometers to be shifted to a north wall, and the rain-gauge to the top of a lower and more accessible building, both which places I pointed out to Mr. Jones. There is no really good position for a rain-gauge in the neighbourhood of the building, so that the results can only have a relative value.

HENRY TOYNBEE.

The Director submitted Captain Toynbee's report to him concerning the issue of instruments and logs from Liverpool as follows:

REPORT of a VISIT to Mr. SMART, who supplies Ships with Instruments and Logs.

The machine for testing barometers was not in good working order, as it leaked so as to make an appreciable difference in the pressure during the time required for testing a barometer.

Considering that all the barometers and thermometers returned to Mr. Smart after a voyage have originally been thoroughly tested at Kew, I instructed Mr. Smart to take the barometer and thermometer now in his hands, which had been latest tested at Kew, and to use them as standards with which to compare the instruments returned from ships, supposing that if an instrument which has been thoroughly tested at Kew before it starts on a voyage agrees with a standard on any one reading when it returns, it may be considered trustworthy at all its other readings; this is the principle which has been followed in London.

If the Committee think it requisite that Mr. Smart should test barometers more thoroughly, the instrument for doing so needs repair, and Mr. Smart needs instruction from some one used to handling such instruments. I have requested Mr. Smart to let the testing instrument remain as it is until he gets further instructions from the Committee.

I requested Mr. Smart to be very particular in his selection of ships, and told him that we should be glad of logs of ships which went to the eastward of the Cape de Verdes or to the West Indies.

HENRY TOYNBEE.

Resolved—That Mr. Scott be requested to make arrangements regarding the repair of the apparatus at Liverpool.

The Director presented the following report of the business done in the Office during the last six months.

REPORT.

GENTLEMEN,

As the Office has been now in operation for more than half of the financial year, I think it well to present you with a report of the work done by the staff, and of the present condition of affairs.

On first taking charge of the Office in February I found a considerable amount of work in progress, consisting of a discussion of the range of sea-temperatures in the South Atlantic, and the conversion of Maury's data for winds into a graphical form. Both these investigations were completed at the beginning of April. The work then undertaken was the systematic extraction of data from logs, and after some time had been spent in testing the mode (that of cards) proposed by the Select Committee, the present mode was adopted. I am glad to say that the plan on which the Meteorological Institute of the Netherlands deal with their data is similar to ours in this respect, viz., a ledger is used instead of cards. The pages of their ledger are subsequently cut up into slips containing sets of observations.

The amount of work done up to October 9th is:—

Log books prepared for extraction - - -	93
Voyages extracted - - - - -	12

The extraction was only commenced at the end of July, as the data books were not prepared until that time.

In addition to this work, the data for sea-temperatures contained in the publications of the Meteorological Institute of the Netherlands have been reduced to English measures.

The other work which has been carried on by the four clerks employed at the marine work has been the daily issue of weather reports for the newspapers, and the correspondence therewith involved. The other members of the staff, with the exception of Captain Toynbee and myself, have been engaged in the ordinary routine duties of the office.

Captain Toynbee has presented me with a special report which I beg to subjoin. For myself, I have, in addition to my regular duties in London, carried on an inspection of all your telegraphic stations in these islands. In this work I have been assisted by Mr. Stewart and Captain Toynbee, and the reports of the visits have been submitted to the Committee in due course.

ROBERT H. SCOTT,
Director.

October 17, 1867.

Report approved.

The Director presented Captain Toynbee's report to him of the work done in his department of the Office. Report referred to Mr. Scott to report thereon to the Committee.

Resolved—That Mr. Scott request Captain Toynbee to take steps to facilitate observations of sea-temperature in steamers crossing the Atlantic and Pacific, and that he be authorized to supply such vessels with the necessary apparatus as now approved.

The Director presented a request from the Town Commissioners of Dundalk, recommending that the fishery barometer be removed from the Custom House to the Town Hall of that place.

Request complied with.

A request for a fishery barometer from Maldon was declined. A similar request from Ballina was complied with.

On the representation of the Chairman of the Kew Committee that assistance would be required by Mr. Stewart in order to enable him to examine regularly the results from the outlying observatories previously to their being sent to the central office;

Resolved—That an allowance at the rate of 70*l.* per annum for the financial year be granted to the Chairman of the Kew Committee for this purpose, to take date from 1st October.

The Secretary read a letter from Mr. Squire, the proposed observer at Falmouth, stating that he would be in readiness to attend at Kew and receive his instruments by the middle of November, so as to enable the observatory at Falmouth to commence from the 1st of January next, provided the sum of 25*l.* were allowed him for all expenses up to the latter date.

Resolved—That the sum of 25*l.* be allowed to Mr. Squire for this purpose.

Resolved—That in consideration of the Stonyhurst College having undertaken to become one of the proposed meteorological observatories in connexion with the Committee, the annual allowance to it for the financial year for meteorological purposes shall be at the rate of 200*l.* per annum, to commence from the time when the observatory is in actual working order.

Resolved—That Mr. Stewart be authorized to order from Sir W. Thomson one of his improved electrometers in order that it may be fitted up for self-recording observations at the central observatory.

Mr. Scott reported a verbal communication which he had had with Professors Thomson and Fuller at Aberdeen.

Resolved—That as the College at Aberdeen appears capable of being fitted for the reception of self-recording instruments, the Secretary write to Professor Thomson, asking definitely whether the Aberdeen College will undertake to work in connexion with the Committee, and on what terms.

Mr. Scott communicated a letter written by the Knight of Kerry to Mr. Kerr, regarding accommodation at Valencia.

The following cheques were drawn:

Mr. Scott and Capt. Toynbee, Travelling Expenses - -	£27	4	10
Office, on account for Petty Cash - - - - - -	10	0	0
Elliott Brothers, Instruments - - - - - - -	42	18	6
Casella ditto - - - - - - -	62	19	6
Negretti & Zambra ditto - - - - - - -	19	0	9
Higgs, Carpenters' Work - - - - - - - -	17	6	9
H. Smart, Liverpool Agency Fees - - - - - -	11	9	3
Central Observatory, One Year's Allowance - - -	250	0	0
Ditto on account for Building - - - -	200	0	0
Amounting to -	£640	19	7

The Committee then adjourned until Monday, 28th inst., at 3 o'clock p.m.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, October* 28, 1867.

PRESENT:

General Sabine in the Chair.

Dr. W. A. Miller. | Mr. Gassiot.

The Hydrographer.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

The Director reported that he had written to Mr. Hartnup regarding the apparatus for testing barometers at Liverpool, but had as yet received no reply.

The Director reported that the two semaphore signals ordered by the Committee were now completed, and might be inspected by the Committee at the works of Messrs. East and Amos at Erith. Mr. Scott was requested to make arrangements for a visit on Saturday.

Read—A correspondence between the Board of Trade and the Treasury relative to the Meteorological Society of Scotland.—(See Minutes of June 24th.)

The Director reported that he had received a letter from M. Le Verrier respecting the times of arrival of telegrams in Paris and their departure for London, and suggesting that a telegram from Groningen should be sent in the absence of one from the Helder. He had replied that the Office would prefer the continuance of reports from the Helder. —Approved.

With reference to formal application to the Norwegian and Spanish authorities to accelerate the despatches from their respective stations, Mr. Scott requested permission to authorize M. Le Verrier to write in the name of this Office, as proposed by him. —Permission granted.

Mr. Scott communicated a correspondence with the Rev. F. Redford regarding the weather reports which are sent to him daily, from which it appears that Mr. Redford issues warnings to the port of Silloth on his own responsibility.

Mr. Scott reported that he was negociating with the Secretary of the Anglo-American Telegraph Company regarding weather reports from Heart's Content.

The Secretary read a letter from Professor David Thomson, of Aberdeen, agreeing to establish a meteorological observatory at Aberdeen working in conjunction with the Committee, for the annual sum of 250*l.*

Resolved—That the Committee accept Professor Thomson's proposal, it being understood that the annual sum of 250*l.* can only be granted from year to year, and that it cover all annual expenses: the cost of instruments, fittings, and plant being defrayed by the Committee. The allowance to commence from the time when the observatory is in actual working order.

The Committee then adjourned until Wednesday, 6th November, at 2 o'clock p.m.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Wednesday, November* 6, 1867.

PRESENT—

General Sabine in the Chair.

Dr. W. A. Miller.	Mr. Spottiswoode.
The Hydrographer.	Mr. Gassiot.
Col. Smythe.	Mr. De La Rue.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Read—A letter from the Board of Trade regarding weather signals, as follows:

(M. 7726.)

SIR, Board of Trade, Whitehall, October 30, 1867.

I AM directed by the Board of Trade to transmit to you, to be laid before the Meteorological Committee the accompanying copy of a letter [not printed herewith] sent to the Duke of Richmond by Sir J. D. Elphinstone, upon the subject of the resumption, during the forthcoming winter, of the system of storm warnings.

In so doing, I am to state that the Board of Trade would be glad to learn whether the Meteorological Committee can supply them with any further information than that already received upon the subject, and, in particular, whether the Committee are prepared to issue cautionary notices, and if so, of what description, on what basis, and on what terms.

I am, &c.

R. H. Scott, Esq., (Signed) T. H. FARRER.
Meteorological Office.

Read—A report of Mr. Scott to the Committee on the subject of weather signals, as follows:

GENTLEMEN,

HAVING received a letter from the Board of Trade with reference to weather intelligence, which I have the honour to lay before you, I submit to you, at the same time, a report supplementary to that printed in your Minutes of the 3d of June.

Since that report was written the inspection of our telegraphic stations has been completed, and though the quality of the information received from them has been, I hope, materially improved, there is yet much to be desired in respect of accuracy of observation and promptitude of report.

I fear that as long as the selection and control of the observers remain in the hands of the Telegraph Companies, who nominate their own clerks, it will not be possible to insure the immediate transmission of intelligence respecting sudden atmospherical changes occurring between the regular hours of observation. The clerks are engaged at their ordinary duties all day long, and are seldom able to leave their respective offices so as to take an observation and make a report to London of any sudden change of wind, &c., which it is most important for this Office to know. In the case of the severe S.W. storm of the 26th ult., which commenced after 8 a.m. on that day, not one of all our observers, except Mr. Gibson, of Aberdeen, sent me information that a gale was beginning. Consequently in the warning telegram sent to Liverpool in the afternoon of that day I was unable to state where the storm was commencing.

I have paid some attention to weather study since the date of my report above referred to, and have seen no reason to alter the opinion therein expressed, viz. :—

" The meteorological information from which the daily weather reports are framed is " not sufficient either in quantity or quality to form the basis of accurate calculations or " of prediction of the direction of the coming storm; it can, however, be depended on " to convey information of serious existing meteorological disturbance."

The system of signals proposed by Captain Toynbee, and submitted to the Committee on the 5th of August, will convey such information in a very complete manner. If this form of signal be not adopted, I should suggest that a drum be used.

The meaning of such signals would be, "A storm is existing, and possibly approaching you."

The nature of the information which would justify the issue of an order to hoist a signal varies with the different winds, and it must naturally be left to the discretion of the person charged with the preparation of the daily weather reports to send out his notices with promptitude on his own responsibility.

In order to carry out this service the following changes in our present system are required:—

Afternoon messages from Nairn or Aberdeen, Greencastle, Scarborough, and Penzance should be obtained.

Sunday messages will be hereafter necessary: at present there are no arrangements for their reception and discussion.

Additional information from the Continent is most urgently required. This Office gets no telegraphic intelligence whatever from any foreign station lying to the eastward of the west coast of France, except Helder and Skudesnaes. If two or three such stations could be obtained, our knowledge of the daily change of position of the isobaric lines would be materially improved.

The "Arrangements for Meteorological Telegraphy" must be rewritten, as fresh instructions to the observers are required.

Lastly, additional assistance in the Office is necessary, if the discussion of the data contained in the logs is to go on as at present. It is not possible for me, as Director, to devote sufficient time to the study of arrears of past weather. The necessity for such study does not admit of a doubt, as without it the carrying on of any system of weather telegraphy is an impossibility.

I therefore request that I be allowed the entire services of one clerk for this duty.

In the event of this study being carried on, I would impress on the Committee the importance of obtaining regular weather reports from the Atlantic lines of steamers.

The importance of some such information is suggested by the Committee appointed by the Government in the year 1865, in their Report, and has been also urged upon me by Captain Toynbee.

Inasmuch as the system of signals which has been sanctioned by the Committee refers to *existing* disturbances, and is not a *prediction*, a fresh message must be sent each day to each port, stating whether the *locality* or the *direction*, or *both*, of the storm has been changed since the date of the last warning telegram.

Signals hoisted in obedience to such a message should remain up for 36 hours, unless fresh intelligence be received in the interval.

ROBERT H. SCOTT,
Director.

Resolved—That this report be received, and that Mr. Scott be empowered to obtain the afternoon messages, and to make inquiries regarding the additional foreign telegrams referred to.

Resolved—That Mr. Scott reply to the Board of Trade in the following terms:

SIR,

I AM directed by the Committee to inform you, in reply to your letter (No. M. 7726) of the 30th ultimo:—

1. That a system of weather telegraphy has been approved by them. The specimen signals will be tested for a short time at one or more of our chief ports, before being issued to the public. They consist of a semaphore similar in principle to a railway signal post.

2. The nature of the information to be thereby conveyed is stated in my letter to the Board of Trade of the 8th of June, to which they beg leave leave to recal the attention of the Board of Trade.

3. The basis on which such notices would be issued would be the study of the daily weather reports, as in consequence of the lateness of the period at which the estimate was sanctioned by the House of Commons, it has not been possible to have any of the self-registering observatories proposed by the Committee set at work. The normal observatory at Kew is in active operation, and it is hoped that more than one of the other observatories will be in action before the 1st of January.

4. The terms on which the notices are to be issued have been already determined between the Board of Trade and this Committee to the following effect:—

The messages shall be sent free, and a complete set of signals presented to such stations as may be named by the Board of Trade as "poor fishing villages." This shall be done to an extent limited only by the funds at the disposal of the Committee for the purpose.

All other stations are to purchase the signals, and pay half the cost of transmission of the messages.

All stations, without exception, are to defray all expenses connected with the maintenance of the gear, and the wages of the several persons charged with the management and hoisting of the signals.

The Committee would suggest that the entire cost of transmission of the messages to all stations might be defrayed by this Office.

Until the new system of signals in preparation by the Committee is complete, they propose to employ the drum as a cautionary signal, to indicate the existence of a gale.

This arrangement could be commenced with very little delay.

Read—A letter from Mr. May regarding signal staffs as follows:

6, Great George Street, S.W.,
London, November 6, 1867.

My dear Sir,

I send you a rough design for above, made in order to give the Committee some notion of what I gathered were their wishes when they visited Erith on Saturday last. I think the points that the Committee have to decide on are,—

1st. Are one or two signals to be used on the same post?

2nd. Is the ring to be retained, or are the arms to work independently of that support and place for indication of the compass points?

3rd. Is the post to be of wood or wrought iron made as a skeleton frame?

As regards the first point, if one signal is on one post, the gear, &c. is much less complicated, and the cost certainly 13*l.* less. Would it not be well to put only one, and in special cases and important stations erect two separate posts?

As regards the second point, I do not like to do away with the iron ring; it is a support to the arms; it gives the opportunity of painting the points of the compass on its face; and it also forms a better guide to the eye at a distance in determining which is the long and which is the short arm, than can be obtained by reverting to the centre and judging of the respective lengths.

As regards the third point, doubtless the iron post will be more durable, but the cost must be more. Make it as cheaply and lightly as we can, it will require a mechanic to fix it used to iron work, and where long, will be subject to damage in transit, besides a heavy cost for carriage, as it must be conveyed on two or more timber trucks, and if no sticks of timber are going down at the same time two special trucks will be charged for by the railway compnny.

I do not see the necessity of making any but the sample complete with wood work at Erith; but the nearest country carpenter to the station where the signal is fixed, upon being supplied with a drawing, will be able to make the post. If the plan I have shown is adopted of placing the signal on the top of the post as suggested by Mr. De La Rue, all the carpenter will have to do is to fix the post upright and make sure that the top is dressed off square to bed the casting on.

You will observe on the rough drawing sent herewith that I have increased the circle to 6′ 6″ diameter, the short green arm, from being under or nearer the post than red one, only leaves 2′ 7″ of it visible, whilst the red arm has 6 feet in length visible, and has at end a circle 2 feet diameter and 2½ ins. wide; this may be a star or any other mode of distinguishment, but the circle is the cheapest. I estimate the selling price of this, with a base timber and spurs, to be 22*l.*: the total height of the signal would with a 22 feet post be 28′ 6″. The price may, in working out and in constructing not less than fifty, probably be reduced about 18*s.*; but I do not think it would be safe to estimate that in quantity they would cost less than 21*l.*

Yours faithfully,
(Signed) Rob. C. May.

R. H. Scott, Esq.

Resolved—That Mr. May's suggestions be adopted, and that he be requested to make a signal apparatus (without staff), with some provision for the hoisting of a drum. The small ring to be capable of being removed.

The Director read a letter from Mr. J. C. Deane, Secretary to the Anglo-American Telegraph Company, offering to supply telegraphic weather information daily from Heart's Content for 200*l.* a year.

Resolved—That Mr. Scott be authorized to make an arrangement with Mr. Deane for three months on these terms.

Resolved—That Mr. Scott be requested to write to Mr. Hodding, second officer of the Peninsular and Oriental Company's sailing ship "Indus," stating the high opinion the Committee have formed of the excellence of his log.

The following cheque was drawn, Office for Petty Cash, 10*l.*

The Committee then adjourned until Monday, the 11th inst., at 3 o'clock p.m.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, November* 11, 1867.

PRESENT—

General Sabine in the Chair.

Mr. Spottiswoode.	Mr. Gassiot.
Dr. W. A. Miller.	Mr. De La Rue.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Resolved—That Mr. Scott be authorized to procure an additional assistant, as suggested by him in his report, to be engaged at a weekly salary.

Resolved—That Mr. Adie receive 200*l.* to account of the instruments which he is making for the Meteorological Committee.

The Chairman of the Kew Committee presented certain accounts for building and alterations at Kew.

For these accounts, and for Mr. Adie's advance, cheques were then drawn as follows :—

Patrick Adie, to account of instruments		£200	0 0
James Long, builder, Richmond:			
The additional building at Kew	£319		
Less advanced (see Minutes of October 17th)	200		
		119	0 0
James Long, for fittings connected with Kew thermograph		64	11 1
Do. do. connected with verification of instruments at Kew		25	12 2
Do. for alterations in the dome of Kew Observatory		12	12 3
Hayward, Tyler, & Co., for girders for the Kew dome		26	9 0
Architect's account (Kew), William Wright		26	19 0
		£475	3 6

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, November* 18, 1867.

PRESENT—

General Sabine in the Chair.

Mr. Spottiswoode.	Dr. W. A. Miller.
Mr. Gassiot.	The Hydrographer.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Read—A letter from the Board of Trade regarding weather signals, as follows:

M. 8020.

SIR, Board of Trade, Whitehall, November 13, 1867.

I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 7th instant, detailing the various arrangements made by the Meteorological Committee for the future issue of Notices concerning Storms.

In reply, I am to request that you will state to the Meteorological Committee, with reference to the concluding paragraph of your letter, that the Board of Trade fully concur in the employment of the drum, as there proposed, and that they think arrangements for using it should be made with the least possible delay.

They would also be glad to learn how soon the hoisting of the drums can be effected, and also what notices it is proposed to issue upon the subject.

As regards the cost and transmission of messages, I am to state that the Board of Trade fully concur in the proposals of the Meteorological Committee.

I am, &c.

R. H. Scott, Esq., (Signed) T. H. FARRER.
Meteorological Office.

Mr. Scott was directed to send the following reply:

SIR, 2 Parliament Street, November 19, 1867.

I HAVE the honour to acknowledge the receipt of your letter (M. 8020) relative to the issue of Notices concerning Storms.

I am directed by the Committee to inform you that they are prepared to issue such notices as soon as the necessary arrangements shall have been made for hoisting the drums.

The signal shapes are, in most instances, at present in charge of the respective officers of Coastguard, in pursuance of Circular 5620 W. issued in December 1866. The Board of Trade, by letter M. 5426, dated Aug. 5, 1867, have transferred the whole of the apparatus, &c. which belonged to them to the Committee, and I have therefore to suggest that the Coastguard be desired to deal with this apparatus in compliance with such requests as may from time to time be addressed to them by this Office.

The Committee would request that the Board of Trade would send to such ports and fishing stations as they consider expedient, a circular stating that the Meteorological Office is prepared to transmit, free of cost, immediate intelligence of all storms of whose existence it may have received information to all parts of the coast, accessible by telegraph, which appear liable to be exposed to their violence. This intelligence to be made public by the use of the drum.

Such a signal would be simply of a warning nature, and, without conveying the impression that the storm would necessarily strike the port where it was hoisted, would imply that extra caution in navigation was requisite.

The Committee are prepared to present a staff and drum to the authorities at each station which will undertake to bear all expenses connected with the care, hoisting, and repair of the signals, and will transmit the messages, free of cost, to the persons charged by the local authorities with their reception, according to the arrangements already sanctioned by the Board of Trade.

The Committee are only awaiting the reply of the Board to set this arrangement in operation.

Lastly, the Committee would request that the Board of Trade would set in action some mode of testing the agreement of the warnings with the winds actually experienced, similar to the former practice of the Wreck Department of the Board.

(Signed) R. H. Scott.

Mr. Scott reported that an agreement had been signed, placing Mr. George's house at Valencia in the possession of the Committee from December 1st, at the yearly rental of 50*l.*

Read—A letter from the Scottish Meteorological Society, asking for copies of any observations made in the North Atlantic during the months of March and September 1859, which may be in possession of this Office.

Resolved—That the requisite extracts be placed at the disposal of the Council of the Scottish Meteorological Society, it being understood that that Society pays the expense of making those extracts.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Tuesday, November 26th,* 1867.

PRESENT:

General Sabine in the Chair.

Mr. Spottiswoode.
Col. Smythe.
The Hydrographer.

The Director and Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Read—A letter from the Board of Trade regarding Telegraphic weather intelligence, as follows:

M. 8387.

SIR, Board of Trade, Whitehall, Nov. 22, 1867.

I AM directed by the Board of Trade to acknowledge the receipt of your letter of the 19th instant, stating that the Meteorological Committee are prepared to issue notices concerning storms when the requisite arrangements shall have been made for the hoisting of the drums upon the coast.

In accordance with the first request of the Committee, I am to state that a letter has been this day sent to the Controller General of Coastguard, requesting him to issue instructions at once to the various officers of Coastguard to deal with the signal shapes and apparatus now in their custody as they may be required to do, from time to time, by the Meteorological Committee.

A list of the various ports and fishing stations to which storm warnings were despatched by the late Admiral Fitzroy is herein inclosed. A copy of a proposed circular for transmission to the ports and stations in question, announcing the new arrangements for notices concerning atmospheric disturbances, and the local publication of them by the drums, is also inclosed.

With regard to the concluding paragraph of your letter, I am to state that the Board of Trade will gladly take steps for instituting a check on the warnings in their Wreck Department, as was previously done in Admiral Fitzroy's lifetime. The forms previously employed may probably suffice for this purpose, but the Board of Trade will gladly adopt any suggestions the Meteorological Committee may make for rendering the check as effective as possible.

I am, &c.

R. H. Scott, Esq., Meteorological Office. (Signed) T. H. FARRER.

Resolved—That Mr. Scott write to the Board of Trade acknowledging the receipt of their circular.

Read—A circular which the Board of Trade propose writing to the Controller General of the Coastguard.—Some slight alterations were suggested.

The form for enabling the Coastguard to check the accuracy of the intelligence received to be referred to the Hydrographer.

Resolved—That Dr. Miller, Mr. Gassiot, and Captain Richards be a Sub-committee, to frame estimates for the ensuing financial year.

Read—The following letter from Captain Toynbee to the Director respecting the supply of instruments to the steamers of the Royal Mail Steamship Company:

R. H. Scott, Esq.

DEAR SIR, November 25, 1867.

WILL you ascertain from the Committee their wishes with regard to the following questions, viz.:—

If they think it desirable that Captain John Hay, R.N., examiner of officers and logs in the R.M.S.P. Company, be asked to keep a set of our instruments fitted and fixed in

his office, so that the officers he examines, who will have to take the observations for us, may be in the habit of reading barometers to thousandths, and see the best way to fit wet-bulb thermometers. They could also learn the use of the hydrometer.

Perhaps it might be well for some person to go down with the first batch of instruments. The same person might see our Southampton agent, and come to some understanding with him, as he has given up answering the letters sent to him from this office.

I am, sir, yours truly,

HENRY TOYNBEE.

Resolved—That a set of instruments be granted to Captain Hay as suggested by Captain Toynbee.

The following cheque was drawn :—For James S. Harding, for office expenses, 10*l.*

The Secretary reported that in consequence of his having applied through Captain Richards to the Admiralty, he had received from Greenwich Observatory two chronometers; namely, Arnold 557, and Earnshaw 509, for the use of the Meteorological Committee.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

13, *Ashley Place, Thursday, December 5th,* 1867.

PRESENT:

General Sabine in the Chair.

Mr. Galton.	Colonel Smythe.
Mr. Spottiswoode.	Mr. Gassiot.
Dr. W. A. Miller.	

The Director, the Rev. Thos. Kerr, and the Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

The Rev. Thos. Kerr submitted plans for fitting up the house at Valencia as an observatory, and was instructed to proceed to Valencia and make the necessary fittings, in concert with this office.

Resolved—That Mr. Scott be authorized to spend a sum not exceeding 5*l.* in procuring books of reference for the observatory at Valencia.

The Secretary gave a verbal account of the state of preparation of the various observatories.

Mr. Scott reported that the Sub-committee appointed at the last meeting of the 26th ultimo, to consider the expenses of the office for the ensuing financial year had met on the 29th ultimo, and that by their directions the following estimate had been forwarded to the Board of Trade:—

Meteorological Office, 1868–9.	£
Salaries - - - - -	2,650
Expenses of observatories - - -	2,000
Supply of Instruments.	
Admiralty - - - - -	500
Mercantile marine - - - -	400
Agencies at ports - - - -	100
Travelling - - - - -	350
Telegraphy - - - - -	3,000
Photo-lithography - - - -	500
Office expenses - - - -	500
	£10,000

The amount of 570*l.* included in the estimates for 1867–8 for Meteorological services under the Admiralty has been omitted from the estimate for 1868–9.

Forwarded by order of the Meteorological Committee,

(Signed) ROBERT H. SCOTT,
Director.

30th November 1867.

Read—A letter from the Board of Trade enclosing one from the Board of Fisheries of Scotland, in which it was stated that the Earl of Seafield was willing to pay for a Fishery Barometer for the port of Cullen.

Resolved—That a barometer for Cullen be procured.

Read—A report from Captain Toynbee to Mr. Scott regarding his visit to Southampton, as follows:—

To Robert H. Scott, Esq., Director.

SIR,

I HAVE to report that, according to the request of the Committee, I visited Southampton on Friday last, and saw Captain Hay, R.N., Examiner of Officers, &c., &c.,

to the R.M.S.P. Company, also Captain Jellicoe of the "Atrato," and Captain Bevis of the "Douro," and the two latter gentlemen were of opinion that the additional work entailed by taking observations for this Department would be more than they could satisfactorily undertake; but they both agreed to take our instruments for one voyage, and to report as to the amount of good observations they found themselves able to record.

Captain Hay and I agree that this would be the best plan. I had fixed a set of instruments on board the "Atrato" as she was to sail in a few hours, left with Captain Hay a set for the "Douro," and placed a third set in Captain Hay's office for the use of the young officers he examines, who are likely to take the observations for us.

Captains Jellicoe and Bevis were of opinion that they could give us more satisfactory results as to the temperature and specific gravity of the sea-water drawn from the injection pipe, which is several feet below the surface, than by trying to draw a bucket of surface-water. I shall be glad to know the Committee's opinion as to the value of such observations.

I also visited Mr. J. R. Stebbing, who is the Southampton agent for this office. Being mayor of Southampton, the West India Hurricane Fund was giving him much extra business; he had also just lost the man who had managed his private business for many years, which he gave as reasons for not having answered my letter sooner. He promised to go into the question this week, and send up a statement of the instruments, &c., in his possession which belong to this Department.

He expressed a wish that he might continue to be the Southampton agent for this Department, if the Committee proposed to renew the issue of instruments.

I am, sir, your obedient servant,
HENRY TOYNBEE,
Marine Superintendent.

P.S.—I shall be glad to know if the Committee wish me to supply the R.M.S.P. Company's ships, which trade to the Brazil coast, as we have so many ships' logs which contain that route. I told Captain Hay that I thought they would not wish me to supply them.

Resolved—That the question regarding the temperature and specific gravity of sea-water be referred to the Hydrographer.

Resolved—That the Committee are desirous of obtaining Meteorological information from the ships which trade to the Brazil coast, and are willing for this purpose to co-operate with Captain Hay.

Read—A letter from Captain Inglis agreeing, on behalf of the Cunard Company, to carry sets of instruments in six of the Company's steamers.

Read—A letter from Mr. W. Inman, agreeing to distribute instruments to commanders of the steamers of the Inman line, as proposed.

The following cheques were signed:—

J. S. Harding, junr., office expenses -	-	£10	0 0
S. M. Clare, Submarine Telegraph Company	-	87	8 2
J. Leyland, Magnetic Telegraph Company	-	122	17 1
H. Weaver, Electric Telegraph Company	-	153	5 10
		£373	11 1

Mr. Scott gave a statement of the progress of work in the office.

With reference to the minutes of November 11th, Mr. Scott reported that he had engaged Mr. Goodwin White at the salary of 1*l.* 18*s.* 5*d.* per week, which is equivalent to 100*l.* per annum.

Resolved—That after the 1st of January next the salaries that are now paid quarterly shall be payable monthly.

The Committee then adjourned.

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, December* 16, 1867.

PRESENT:

General Sabine in the chair.

Mr. Galton.	Col. Smythe.
Dr. W. A. Miller.	Mr. De La Rue.
The Hydrographer.	Mr. Gassiot.

The Director and the Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

With reference to the question regarding the temperature and specific gravity of sea water suggested by Captain Toynbee in his report of Dec. 5th, the Hydrographer was of opinion that it is unadvisable to use the water from the injection pipe for the purpose of determining these elements.

Read—A report from Captain Toynbee to Mr. Scott regarding his visit to Liverpool, as follows:—

Robert H. Scott, Esq., Director of the Meteorological Department.

DEAR SIR, 2, Parliament Street, Dec. 14, 1867.

ACCORDING to the request of the Committee, I have visited Liverpool taking with me three sets of instruments for the Cunard Line of Royal Mail Steamers, and three for Inman's Line, which also runs to New York.

I have to report that both the managers and Commanders of these steamers show every desire to carry out the wishes of the Committee. Before leaving I supplied the steamer "Scotia," Capt. Judkins, and had an opportunity of explaining the use of the instruments to four or five of the other Commanders in Cunard's Line.

I also supplied Capt. S. Brooks of the "City of London," belonging to Inman's Line, explaining the use of the instruments to him. He kindly promised to explain them to the other Commanders in that line.

Two sets of instruments have been left with Capt. Inglis, the manager of Cunard's Line, and two with F. Harris, Esq., the manager of Inman's Line. These gentlemen have kindly undertaken to put them on board the next ships which sail, and to forward to us the logs when filled up, and the defective instruments. They have also promised to receive sets of instruments from the office, and to put them on board their steamers until all which they can recommend are supplied.

I learnt from Capt. Inglis that a Mr. William Cunard has a line of steamers from New York to Bermuda, and although this line is independent of the Liverpool firm, Capt. Inglis said that he would ask them to take our instruments and logs if the Committee wished for their services, and this seems to be an important route on which to collect data for West India hurricanes.

During my stay in Liverpool I collected information respecting several other lines of steamers to America, the West Indies, and Brazil. One to Brazil belonging to Messrs. Lamport and Holt was specially recommended by Mr. Rundell, who introduced me to Mr. Lamport. He promised to help forward the wishes of the Committee if they want the services of his line. I also heard that one of his Commanders has very scientific tastes.

I shall be glad to know if the Committee wish me to supply as many Atlantic lines as we can get to work, so as to bring in a mass of simultaneous observations.

With this I hand for the information of the Committee the circulars of various lines.

Although it seems well that I should start the different lines, taking the first sets of instruments with me, and seeing their managers and some of the captains, it is not possible for me to take down every case of instruments. We shall soon have to send other sets to the Cunard and Inman's lines. I would therefore suggest that it might be advisable to ascertain whether the London and North-western Railway Company could not make special arrangements for conveying our instruments and handing them over to the Liverpool agents of Steam Companies. It is most important that they should be carried in a "through" luggage van, per passenger train, and then by cab or special carriage to their destination.

The six boxes which I took down with me travelled safely, even though the luggage was changed at Warrington, showing that they are safe with special care, and the extra expense of the special care would be covered by the instruments saved.

Instrument for testing Barometers.

This instrument is now in working order. Its original intention was to test the barometers belonging to ships, which had not been previously tested at Kew. It is in a very bad light, is subject to great tremor from waggons passing, and although originally constructed to have two divisions of the micrometer screw to 1,000th of an inch, it has now only 1·75 making a calculation necessary after each reading. Then, again, as the inches on the Kew barometers vary in length, for great nicety, a separate value has to be found for the divisions of the micrometer screw with regard to each Kew barometer.

Mr. Smart complained of the great trouble which this entailed, and hoped that he might be allowed to carry out his present plan with regard to the Kew barometers, which is the same as that practised by Mr. Strachan at this office, viz., to compare the instruments when returned, with a good barometer lately tested at Kew.

He asked for a special instrument from Kew, the one he is now using as a standard having a slight crack in its scale. He also asked for a thermometer with a porcelain scale, to be used as a standard, and another for the wet bulb to be shown. to Commanders.

If it be decided that Mr. Smart is ever to use the testing instrument, it might be well that some one used to handling the Kew instrument should be requested to compare the two by means of a third barometer. Mr. Smart has an idea that the two testers do not give the same errors to the same instrument. He has no provision for making the quicksilver convex by artificial heat similar to that in use at Kew.

Mr. Smart showed me a barometer just returned, which was in good order, but very dirty and dusty, asking whether it ought to be returned in that state, or cleaned first. I promised to let him know the decision of the Committee.

I remain, &c.

HENRY TOYNBEE,
Marine Superintendent.

Resolved—That Mr. Scott be authorized to procure thermometers and hydrometers sufficient to make complete sets with the barometers now in the office.

Resolved—That arrangements be made to supply instruments to the line between New York and Bermuda.

Resolved—That the apparatus for testing barometers now in Liverpool be returned to this office.

Read—A letter from the Rev. E. Holmes, forwarding results of meteorological observations made at Canterbury, New Zealand, and asking for a copy of the publications of this office. Resolved—That these be granted.

Read—A Letter from W. Thomas, Aberdare, (Cwmaman Collieries), offering to furnish a copy of a register he proposes to keep above and below ground.—Offer accepted.

Read—An application from Swanage for a fishery barometer.—Declined.

The following cheques were drawn :—

J. S. Harding, office - - - - -	£10
Rev. Dr. Robinson, Armagh, on account of building -	100
	£110

Mr. Scott presented a report (*see* page 89) of the amount and condition of the work found by him in the office, and requested the opinion of the Committee as to its completion and publication.

The Secretary read a letter from Mr. Louis J. Crossley of Willow Hall, Halifax, stating that he would be happy to co-operate with the Meteorological Committee, and that he had already procured an anemograph on the Kew pattern, while he had also the intention of procuring a barograph and thermograph.

The Secretary reported the Meteorological Observatory at Kew as complete and in regular operation, and exhibited curves of the different instruments.

The Committee then adjourned until Monday 23d inst. at 3 p.m.

Sailing Sheets already sent

The following is a statement respecting work done by the Meteorological Department before it was under management of a Committee of the Royal Society.

Sea Temperature.—South Atlantic.

1. Under the direction Mr. G. H. Simmonds, assisted by Mr. F. Gaster, a Collection, with grouping and averaging, of nearly 100,000 observations of Sea Temperature has been made, in the following manner:

A. The area embraced is that district to the southward of the Equator which lies between the meridians of 70° W. and 40° E. To the *Eastward* of the Cape of Good Hope, however, observations made in lower latitudes than 20° S. are not extracted.

B. Only the most trustworthy observations contained in the Official Registers of this Department have been used—all those made with private thermometers, the errors of which were unknown, being rejected.

C. Three observations per diem were extracted, viz., those made at the hours of 4 a.m., noon, and 8 p.m.

D. The observations were collected into districts (or "squares") bounded by each 5th degree of Latitude and Longitude, all those on any one day being placed in the same square.

F. While being *collected* the observations were also *grouped* into months. Separate sheets were kept for each 10° square. A distinct part of each sheet for each of the 5° squares it contained, and a particular column was reserved for each of the hours, 4, noon, and 8.

2. The above were subsequently "worked up" in the following manner:

A. The Mean Temperature of the sea in each 5° square has been obtained for each month from *all* the observations made in that square. The results are tabulated, and the number of observations from which each was obtained, is written in red ink beside it. For all squares in which the Mean Temperature had been obtained for each month in the year, the average of these Mean Temperatures was taken as the Yearly Mean Temperature of the squares.

B. A mean for each of the hours 4 a.m., noon, and 8 p.m., has also been obtained, with a view to determining the Diurnal Range. Only those observations were used when each of the hours was represented on the same day. These values are not yet tabulated.

3. A *collection* of Deep-sea Temperatures in the same region has been *commenced*, but very little is done in that direction at present.

4. Some notes, of value, respecting sudden changes, &c., have been collected.

The *completion* of these Tables (excepting that of the Deep-sea Temperatures), together with completing the notes, for publication, would occupy one person (6 hours per day) about 2 or 3 weeks.

Meteorological Data.—North and South Pacific Oceans, and the China Seas.

1. A very large number of Meteorological Observations of the Barometer, Temperatures (Dry and Wet), Wind (direction and force), Amount of Cloud, and Weather, with some "Remarks" by the Observers, have been *collected* and "*grouped*" in months, for the region of the North and South Pacific Oceans and the China Seas. The area

embraced is the whole ocean surface between the meridians of 90° E. (by 180°) to 70° W., together with a small district lying to the east and north of Cape Horn, as far as the Logs would furnish.

This collection also was made by Mr. G. H. Simmonds, assisted by Mr. F. Gaster, and on *principles* precisely similar to those of the South Atlantic Sea Temperature Collection. No totalling or averaging whatever has yet been done.

Some few of the temperatures will need to be cancelled, the thermometer having in such cases been kept in the cabin or other unsuitable place. With this exception, only the most reliable statistics have been used.

A. The *Barometer* observations are corrected, and reduced to 32° F. at sea level.

B. The *Temperatures* (when the error of the thermometer exceeded 0°·5) are corrected.

C. The *Direction* of *Wind* has been corrected for variation, to the nearest point, and represented by the numbers 1 to 32 (1 = N.N.E., 8 = E., 16 = S., 24 = W., 32 = N.) The *Force* is that given by the Captains—scale 0 to 12.

D. The *Amount of Cloud* scale is 0 to 10 (0 = clear, 10 = overcast).

E. The Beaufort scale for *weather* is used.

F. Any valuable remarks by the Captains are extracted in the " Remark " column, and also notes on sudden changes, &c.

Although the completion (by totalling, averaging, &c.) of this work would occupy one person about 5 months, that time would be but a small fraction of what has been already expended in making the collection as it stands at present, it having taken from 4 to 5 years. Scarcely anything has yet been published for the district embraced.

Meteorological Observations made at Fixed Stations, Returns of which are now in this Office, December, 1867.

In Table II., page 92, is a tabular statement respecting the manuscript returns of Meteorological Observations made at fixed stations, which are in the Meteorological Office at the present time, and which are nearly complete.

Observations at some of the stations were published by the late Vice-Admiral FitzRoy, but these were of earlier date than those mentioned in this return.

In addition to this list there is a large amount of Returns from other land stations which have not been reduced at all.

TABLE I.

Material now in the Meteorological Office.

Ocean.	District discussed.	Nature of Work done.	Present Stage.	Work required to complete, and Time necessary (for one Person).	Remarks.
North Atlantic.	Lat. 40° N. to 60° N.	Wind Charts.—In 5° squares. Wind—direction and force. Maury's Observations combined with those from B. T. Logs.	Collected, and grouped in months. Scales calculated for drawing charts.	Charts to be drawn, &c., &c. 9 months.	—
Do. -	Lat. 0° to 40° N. (in 4 parts).	Wind Charts.—In 5° squares. Wind—direction and force. Currents and temp. of sea (in $2\frac{1}{2}$° squares), &c., for each of 8 months.	As above, and nearly all the wind-stars already drawn.	Currents, sea temp., dip., var^{n}., &c. to be inserted. 3 months.	To complete a set now $\frac{1}{3}$ published. The charts printed are for the middle month of each quarter.
Do. -	Lat. 40° to 60° N.	Sea Temp.—In 5° squares; for the summer and winter months.	Complete (sent to Admiralty in Sept. 1865).	—	—
Do. -	Do. -	Currents.—In 5° squares -	For each month (sent to Admiralty).	—	—
South Atlantic.	Lat. 0° S. to 60° S.	Wind Charts.—In 5° squares. Wind—direction and force. Maury's observations combined with those from B. T. Logs.	Collected, and in grouping tables for each month.	Scales to be calculated, charts drawn, &c., &c. 3 years.	—
Do. -	Do. -	Currents.—In 5° squares -	Collected, and grouped in tables for each month.	(This was done for the Admiralty.)	—
Do. -	The whole surface of the ocean.	Sea Temp.—In 5° squares -	(For details, see the former part of this Report.)	3 weeks.	—
North Pacific.	(Whole surface.)	Wind Charts.—In 5° squares. Wind—direction and force, for each month.	Collection of data commenced.	No estimate can be formed.	—
Do. -	Do. -	Meteorological Data.—In 5° squares.	Collected and grouped.	About 5 months (with that of the S. Pacific and China Seas.	(See former part of this Report).
South Pacific.	Do. -	Do. Do. - -	Do. do. -		Do. do.
All Oceans	—	"Remarkable passages."—Gales, squalls, ice, Auroræ, &c., &c.	Extracted from B. T. Registers.	—	Were once printed in the form of 3 "Numbers of Met^{l}. Papers," but afterwards cancelled.
Do. -	—	Collection of Notes and Remarks on Currents and Tides.	—	—	—

Orkney.—Anemometry.

Orkney -	—	Anemometer Records (from 1st Oct. 1862 to 30th Sept. 1864).	From 1. X. 62. to 30. IX. 63. tabulated for publication.	To complete the other 12 months and combine would occupy about 3 months.	—

TABLE II.

MANUSCRIPT METEOROLOGICAL OBSERVATIONS now in the METEOROLOGICAL OFFICE (Unpublished by this Office). *See* p. 90.

Station.	From whom the Return is received.	Nature of Observations.	Limiting Dates.	If any are Published by this Office.	Remarks.
Natal (Maritzburg).	Dr. Mann, F.R.A.S. &c.	Barometer—Temperature (dry and wet bulb). Dew point, humidity, amount of cloud, direction and force of wind, 3 times a day. Max., min., and mean temps., and rain, once a day. Moon's age and remarks. Hours are 9 a.m., 3 p.m., 9 p.m.	From Jan. 1860 to Feb. 1866 (continuous).	Yes. From Jan. 1858 to March 1859 (in 5th No. of Meteorological Papers).	Dr. Mann was for some time at the Cape of Good Hope. The records are regularly kept, and monthly averages, &c. are made out.
New Westminster (British Columbia).	Government House, Met. Observy. (Sgd.) Arthur W. Birch.	Observations very similar to above, but *twice* a day (9 a.m. and 3 p.m.), and "Max. in Sun's rays," and "Min. on Grass" in addition. (Royal Engineers' form and diagram.)	Jan. to Dec. 1865 (continuous) and one month in 1859.	No.	—
Trinidad -	The Government Botanist (W. Crüger).	Barometer—Temperatures (dry and wet). Dew point, elasticity of vapour, and humidity. (Dr. Apjohn's formula used). Wind — direction and force and hours of change. Cloud, twice a day, and remarks, with *large diagrams*. Monthly means, &c. deduced.	Feb. 1862 to June 1864.	No.	Mr. Crüger has written a pamphlet on this subject in which some of the results and diagrams are published.
Bangkok -	Dr. Campbell	Barometer (?Aneroid)—Temperatures (dry, wet, max. and min. in air). Dew point, elasticity of vapour, humidity, &c. Wind—direction and force (Beaufort scale). Cloud and rainfall, with monthly means, &c. 2 observations daily.	Jan. to Dec. 1858.	No.	Dr. Campbell had no B. T. instruments at this time, and in 1859 it is known that an aneroid was in use. The observations are not reduced to mean sea level.
—	—	Aneroid — Temperatures as above. Wind, cloud, and weather (on a MS. form). 3 observations a day.	Jan. 1859 to Dec. 1861.	No.	The readings of the instruments are registered in a very peculiar manner, which needs some explanation. The *Thermometers* appear to have been tested at Kew and Greenwich.
Navigator's Islands.	H. M. Consul Williams.	Barometer (unreduced)—Temperature of air, direction and force of wind. Cloud and weather (Beaufort scale). 1 observation a day, 4 p.m., but the diagram has 2 observations per day, 8 a.m. and 4 p.m.	Sept. 1862 to March 1863 and Jan. 1864 to Jan. 1865.	No.	Occasionally the observations are omitted.
Oban - -	Admiralty Survey (E.J.Bedford)	Monthly abstracts. Highest and lowest barometer and temperature in the month. Total rainfall, direction of wind. Also highest and lowest barometer and temperature during the year. Small forms.	1858 to 1865 (continuous).	No.	The following note is at the bottom of the form. In open ground the Thermometer would be about 2° lower than that registered.
Cape of Good Hope.	Sir T. Maclear	Meteorological observations made at the C. G. H. Observatory.	1846 to 1860 (continuous).	?	—
Fiji - -	H. M. Consul	Monthly abstracts. Barometer, temperatures, rain, with remarks.	Jan. 1865 to June 1867.	No.	B. T. instruments are used. There are also 13 months observations (including the year 1861) made by the Rev. Mr. Binner, kept in the form of a Log Book.
Elsinore -	H. M. Consul	Barometer — Max. and min. temps. Wind, direction, and weather. Instruments are read at noon, but wind and weather are noted at "morn, noon, even."	Jan. 1856 to June 1858, July 1859 to Dec. 1859.	No.	The instruments are foreign, and the reading will need conversion.
—	—	Merely the direction of the wind, and a few remarks. Once a day.	—	—	—
Ascension -	Lt Rokeby, R.M.	Meteorological Observations of Barometer, thermometer, wind, tidal observations, &c. &c. 15 times a day. With means of each element, monthly abstracts, and Term Day observations. Also anemometrical records and reduction.	Sept. 1863 to Oct. 1865 (continuous).	No.	—

METEOROLOGICAL COMMITTEE.

2, *Parliament Street, Monday, 23rd December* 1867.

PRESENT:

General Sabine in the Chair.

Dr. W. A. Miller. | Colonel Smythe.

Mr. Galton.

The Director and the Secretary to the Committee were in attendance.

The minutes of the last meeting were read and confirmed.

Read—A letter from the Board of Trade regarding the estimates for the ensuing year, as follows:—

M. 9252.

SIR, Board of Trade, December 17, 1867.

I AM directed by the Board of Trade to transmit to you, inclosed, a letter from the Treasury, on the subject of the Vote for Meteorological purposes.

As the letter is original I am to request that when done with it may be returned to this department.

I am, &c.,

R. Scott, Esq. THOMAS GRAY.

Meteorological Office.

(Copy.) (M. 9252.)

SIR, Treasury Chambers, December 13, 1867.

IN reply to Mr. Gray's letter of 4th instant, respecting the amount which will be required in the estimates for 1868-9, for the Meteorological Office, I am commanded by the Lords Commissioners of Her Majesty's Treasury to state, for the information of the Lords of the Committee of Privy Council for Trade, that provision will be made for this service in the Estimate for "Learned Societies, Great Britain."

I am, &c.,

The Secretary of the Board of Trade. (Signed) GEO. A. HAMILTON.

Mr. Scott submitted the following reply which he had sent to this letter, which was approved by the Committee:—

SIR, Meteorological Office, December 18, 1867.

I HAVE the honour to acknowledge the receipt of your letter M. 9252, enclosing a communication received by you from the Treasury relative to the Estimates furnished for this office for the year 1868-9.

I enclose herewith the communication in question.

I am desired by the Committee to draw your attention to my letter to you, dated April 23rd, 1867, in which it is stated that the Royal Society "neither collect nor conduct meteorological observations."

In the estimates for 1867-8 the sum required is described as "for Meteorological Observations and Experiments, formerly under the Board of Trade, to be conducted in future by the Royal Society." This heading is accordingly incorrect, and I am instructed to request that you will have the kindness to take such steps as may be necessary to ensure the correctness of the heading under which this sum is placed in the estimates for 1868-9.

I am, &c.,

Thomas Gray, Esq. ROBERT H. SCOTT,

Board of Trade. Director.

Mr. Scott reported that application for a service of weather telegrams had been received from the following places:—

Hayle,	Boston,
Grimsby,	Liverpool,
Morecambe,	Goole,
Fleetwood,	Leith,
Dungeness,	Barnstaple, (including Instow
Aberystwith,	and Ilfracombe),
Carnarvon,	

and he was directed to forward them to the Board of Trade.

Read—A letter from the Rev. Thos. Kerr to Mr. Scott regarding the forwardness of the preparations for the observatory at Valencia.

Read—A letter from R. Russell, Esq., requesting the Committee to assist him in publishing certain meteorological charts.

Resolved—That the Committee are not in a position to do so, not having funds at their disposal for this purpose.

Resolved—That the officers of the Committee, namely, the Director, the Marine Superintendent, and the Secretary to the Committee be reappointed until the 1st of April next, the beginning of the financial year.

The Secretary submitted plans for tabulating from the curves of the meteorological self-recording instruments, which were approved with certain alterations, and a six months' supply was ordered to be printed.

Resolved—That a sum not exceeding 20*l.* be placed at the disposal of the Secretary to defray the expenses of certain back work that will necessarily fall upon the Central Observatory before the system of tabulation is completely organized.

The Secretary reported the Meteorological Observatories at Glasgow and Stonyhurst as complete and in regular operation:

The following cheques for salaries for quarter ending 31st December 1867 were drawn:—

	£	*s.*	*d.*
R. H. Scott	200	0	0
H. Toynbee	87	10	0
B. Stewart	100	0	0
W. Salmon	50	0	0
J. S. Harding, junior	37	10	0
*R. Strachan	45	0	0
F. Gaster	25	0	0
†J. S. Harding, senior	19	10	0
C. Harding	22	10	0
R. H. Curtis	19	10	0
‡G. White	10	13	7
Rev. T. Kerr (Valencia)	62	10	0
	£679	13	7

* Including extra allowance for Instruments.
† For 13 weeks.
‡ From 21st November 1867.

The Committee then adjourned.